

Rodriguez, Susan (CONTR)

From: Hall, Martin L <mlhall@firstenergycorp.com>
Sent: Thursday, January 04, 2018 7:27 AM
To: McCormack, Brian
Subject: A few facts - PJM

Hey - I know you have been following the situation going on with the current cold snap. Thought I would share some snapshot analysis put together by some of our folks this morning. It provides a little perspective of the situation. Just facts that are readily available on the PJM website. The chart below is interesting as it looks at megawatts that cleared the capacity auction for this year and the amount that is actually performing at this point in time- for example, only 26k megawatts of nuclear cleared the auction, but over 35K is showing up (similar for coal). While 64K of gas cleared the auction, but only 26K is showing up. In other words, the capacity auction relied on gas, but the system today is relying on coal and nuclear.

The brief synopsis below was put together by our internal experts.

State of Play

Load is currently (8:30am) 125.4k MW's, but is expected to rise to 130.5k around 6:30pm. Tomorrow's peak load is forecast at 134.3 MW and is expected at 7:30am, with an evening peak of 131k. Note that the 2014 Polar Vortex load peaked at 141.8k MW's.

Real-time LMPs were below \$100/MWh overnight, rising throughout the morning, with a current (8:30am) system-wide real-time LMP of \$167/MWh. Day Ahead prices at the AD Hub for today are \$128.86 on-peak, \$81.23 off-peak.

Operational flow orders (restrictions/limitations placed on gas consumption by pipeline operators) currently exist on major natural gas pipelines throughout PJM, including Transco, Texas Eastern, Dominion and Columbia. This is likely to impact the availability of natural gas for generators with interruptible fuel contracts.

Below is the supply Mix (as of 7am) compared to MW cleared in RPM (Capacity Auction) for 2017/2018. Note that current performance could be impacted by a variety of factors, including fuel prices, operational issues, maintenance issues, fuel availability, etc.

Current Performance			
Fuel Type	Actual MW	RPM Cleared MW	Performance
Coal	49,403	45,354	-4,049
Gas	26,410	64,089	-37,679
Hydro	1,890	7,580	-5,690
Nuclear	35,524	26,401	9,123
Oil	6,018	8,875	-2,857
Solar	0	116	-116
Wind	4,796	804	3,992

There have been no performance assessment hours since the start of the cold snap, however PJM has issued cold weather alerts for generators through Saturday evening.

We will continue to monitor closely and provide another update this afternoon.

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Rodriguez, Susan (CONTR)

From: Winberg, Steven
Sent: Friday, January 05, 2018 8:11 AM
To: Eckard, J. M
Subject: RE: Follow-up from WCC lunch

Mike

I want to talk to FE management about the next generation of coal-fueled generators. It seems pretty clear to me that the power industry is not going to be building the typical coal-fired boilers (supercritical, ultra-supercritical or advanced ultra-supercritical) plants over the next 10-15 years. If they do, it will likely be Japanese or Chinese technology as they have moved ahead of the US in this boiler space. In addition, we have the backbone (1970 thru early 1980s vintage) of the coal fleet aging and by 2030, the average age of this backbone will be over 50 years. So in the 2030 timeframe, it would be good if power producers had a choice other than natural gas. DOE has been developing transformational technologies such as supercritical CO₂, chemical looping, pressurized oxygen. I would like to accelerate the development effort so that these technologies would be ready by 2030.

Objectives of meeting:

1. Status review on these technologies
2. Discuss FE's future generation plans including planned retirements (coal, nuclear and nat gas)
3. Guidance from FE on what you need and how we can best help
4. Discuss what FE would/could do to assist DOE in this effort.

Much thanks,
Steve

-----Original Message-----

From: Eckard, J. M [mailto:jeckard@firstenergycorp.com]
Sent: Thursday, January 04, 2018 3:38 PM
To: Winberg, Steven <Steven.Winberg@hq.doe.gov>
Subject: RE: Follow-up from WCC lunch

Steve,

Thank you for the follow-up e-mail. And please forgive my tardy response. You're correct; it is a hair-on-fire time right now. We're expecting a decision from FERC on the all-important "Grid Reliability and Resiliency Pricing" rulemaking any time now. And it couldn't come at a more critical time for the bulk power system.

Absolutely, I will be glad to organize a meeting with our appropriate executives and generation experts. Could you give me a little more information (i.e. DOE participants, desired take-aways and dates/timeframes)? I'll come back to you with some options. Thanks and Happy New Year.

And thanks again for delivering the keynote address to our annual Washington Coal Club Awards Luncheon. Your talk was timely and meaningful. And great job on the delivery.

Mike

J. Michael Eckard
Director, Federal Affairs

FirstEnergy
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Washington, D.C. 20004
202.434-8153
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jeckard@firstenergycorp.com

-----Original Message-----

From: Winberg, Steven [mailto:Steven.Winberg@hq.doe.gov]
Sent: Tuesday, January 2, 2018 5:31 PM
To: Eckard, J. M <jeckard@firstenergycorp.com>
Subject: [EXTERNAL] Follow-up from WCC lunch

Mike

First, I hope that you had a (b) (6)

Second, while FirstEnergy might be hair-on-fire with the cold weather, it does reinforce the need to assess baseload power!

At the WCC lunch you and I briefly discussed scheduling a meeting with the appropriate FirstEnergy people to talk about the next generation of coal-fueled power.

DOE is advancing these transformational coal technologies and we need power producer support and guidance.

Would you be willing to help facilitate a meeting with the appropriate people at FirstEnergy?

We would be happy to go to Akron or wherever most convenient for your folks.

FYI, I am also reaching out to AEP, Duke, TVA, Southern, NRG and am open to suggestion on others.

Thanks you,
Steve Winberg

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Rodriguez, Susan (CONTR)

From: Lauren.Maddox@hklaw.com
Sent: Wednesday, January 17, 2018 1:28 PM
To: McCormack, Brian
Subject: FW: DOT
Attachments: res.doc

Brian, hope you're well! (b) (6)

Given the close ties among agency chiefs of staff, I'm wondering if you might know Geoff Burr, chief for Secy. Chao? I ask because a former colleague – and someone I recruited off the Hill many moons ago – (b) (6) -- is looking to join the administration at DOT. (b) (6) is terrific – hard working, dependable and committed. In working with (b) (6) over the years to advance numerous policy and funding goals (b) (6) always knows the right person to call and case to make to bring about positive outcomes.

I understand from a friend and former colleague at WH personnel that (b) (6) is in the mix. If you happen to talk with Geoff, I would greatly appreciate you mentioning (b) (6) could be a great addition to Geoff's team, especially at this critical time when attention is on advancing the president's infrastructure agenda.

Thanks much!

Warm regards, Lauren

Lauren Maddox | Holland & Knight

Sr Policy Advisor

Holland & Knight LLP

800 17th Street N.W., Suite 1100 | Washington, DC 20006

Phone 202.469.5444 | Cell (b) (6)

lauren.maddox@hklaw.com | www.hklaw.com

From: (b) (6) [mailto:(b) (6)]
Sent: Tuesday, January 16, 2018 12:48 PM
To: Maddox, Lauren M (WAS - X75444) <Lauren.Maddox@hklaw.com>
Cc: Elizabeth Morra <(b) (6)>
Subject: DOT

Lauren,

Hope all is well with you. I'm reaching out as I recently sent my resume to Sean McMaster and Anthony Bedell at DOT. They've been terrific to work with in the past and am grateful they are in the administration at such an important time and critical agency. Anthony let me know he forwarded my information to White House personnel. Perhaps you also know someone there in order to follow up?

(b) (6)

(b) (6) With President Trump and his team looking to advance an infrastructure plan in the coming months, it would be a privilege to work with Secretary Chao and her team and put my experience to work. I first met Secretary Chao many years ago when I was working in the Senate for Republican members, helping them

push content out the door on their priority issues. I admire her greatly and believe she's going to do great things this year.

Finally, I'm not picky! Infrastructure is such an important policy item...I'm happy to help in any way that would help the President and Secretary achieve their joint goals.

Please find attached a copy of my resume. Any help would be greatly appreciated!

All the best, (b) (6)

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(b) (6)

(b) (6)

Cell: (b) (6)

(b) (6)

**Work
Experience:**

(b) (6)

2001-November 2017

Served as a lobbyist for a variety of clients in a number of issue areas including appropriations, defense, transportation, telecommunications, water infrastructure, homeland security, housing, education and healthcare. Responsibilities included crafting legislative strategies for clients, drafting bill and report language, working to insert language into bills, reviewing and analyzing legislation for clients, mentoring team members on the appropriations process and helping them with appropriations strategies; navigating and tracking the appropriations process for the firm and clients; setting up meetings with Members of Congress and key staffers in both the House and Senate; navigating and tracking various transportation and water authorization bills, developing materials for Hill visits; prepping clients for key meetings; generating Hill letters of support, writing press releases, talking points, op-eds and RFPs, and pursuing business development opportunities.

(b) (6)

1995-2001

Served as official spokesperson for the committee, fielding daily press calls from national print, radio, and television reporters. Responsibilities included developing weekly communications plans for Committee Chairmen Bill Young (R-FL) and Bob Livingston (R-LA) and all thirteen subcommittees at the time; coordinating communications strategy and "message" with Republican Leadership; preparing talking points and "Dear Colleague" letters for the Chairman and assisting him on the House floor; originating and writing press releases, "Letters to the Editor," and op-eds; organizing weekly news conferences and press briefings; assisting media at hearings and mark-ups; helping Congressional staff with appropriations materials/information; and writing bill summaries for press and Congressional staff.

(b) (6)

1994-1995

Responsibilities included writing daily press releases; serving as Senator's official spokesperson; setting up weekly television and radio news conferences; covering Senate hearings; coordinating Mississippi and national media requests; arranging interviews and statements for daily satellite feeds; and coordinating news conferences with other Senate offices.

(b) (6)

1993-1995

Responsibilities included writing, anchoring and interviewing senators and key staffers for a live, half-hour news program advancing the week's legislative agenda.

(b) (6)

1993-1994

Responsibilities included writing press releases on daily message for Leadership; serving as conference spokesperson; interviewing Senators and writing and editing news packages for daily satellite feeds to stations around the country.

(b) (6)

1990-1992

Responsibilities included anchoring, reporting and packaging daily news stories for the 7pm newscast, "Eye on the Piedmont."

(More)

(b) (6)
1988-1990

Responsibilities included anchoring, writing and producing weekend newscasts; reporting and packaging stories for the evening newscasts during the week.

(b) (6)

1987-1988

Responsibilities included anchoring, writing and producing morning cut-ins; reporting and packaging stories for the evening newscasts.

Education:

(b) (6)

B.A. Journalism, 1987

Minor: Political Science

Personal:

(b) (6)

Rodriguez, Susan (CONTR)

From: McCormack, Brian
Sent: Thursday, January 18, 2018 5:17 AM
To: Lauren.Maddox@hklaw.com
Subject: RE: DOT

(b) (6)

-----Original Message-----

From: Lauren.Maddox@hklaw.com [mailto:Lauren.Maddox@hklaw.com]
Sent: Thursday, January 18, 2018 8:16 AM
To: McCormack, Brian <Brian.Mccormack@hq.doe.gov>
Subject: RE: DOT

Ha! (b) (6)
(b) (6)

Lauren Maddox | Holland & Knight
Sr Policy Advisor
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-----Original Message-----

From: McCormack, Brian [mailto:Brian.Mccormack@hq.doe.gov]
Sent: Thursday, January 18, 2018 8:05 AM
To: Maddox, Lauren M (WAS - X75444) <Lauren.Maddox@hklaw.com>
Subject: RE: DOT

(b) (6)

-----Original Message-----

From: Lauren.Maddox@hklaw.com [mailto:Lauren.Maddox@hklaw.com]
Sent: Wednesday, January 17, 2018 7:28 PM
To: McCormack, Brian <Brian.Mccormack@hq.doe.gov>
Subject: Re: DOT

Lo!. Thanks!

Lauren Maddox | Holland & Knight
800 17th Street N.W., Suite 1100 | Washington, DC 20006<x-apple-data-detectors://1/1>
Phone 202.469.5444<tel:202.469.5444> |
lauren.maddox@hklaw.com<mailto:lauren.maddox@hklaw.com> | www.hklaw.com<http://www.hklaw.com/>

On Jan 17, 2018, at 7:05 PM, McCormack, Brian
<Brian.Mccormack@hq.doe.gov<mailto:Brian.Mccormack@hq.doe.gov>> wrote:

Hi Lauren (b) (6)

I'll connect with Jeff on this.

From: Lauren.Maddox@hklaw.com<mailto:Lauren.Maddox@hklaw.com> [mailto:Lauren.Maddox@hklaw.com]
Sent: Wednesday, January 17, 2018 4:28 PM
To: McCormack, Brian <Brian.Mccormack@hq.doe.gov<mailto:Brian.Mccormack@hq.doe.gov>>
Subject: FW: DOT

Brian, hope you're well! (b) (6)

Given the close ties among agency chiefs of staff, I'm wondering if you might know Geoff Burr, chief for Secy. Chao? I ask because a former colleague - and someone I recruited off the Hill many moons ago - (b) (6) -- is looking to join the administration at DOT (b) (6) is terrific - hard working, dependable and committed. In working with (b) (6) over the years to advance numerous policy and funding goals, (b) (6) always knows the right person to call and case to make to bring about positive outcomes.

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Thanks much!

Warm regards, Lauren

Lauren Maddox | Holland & Knight
Sr Policy Advisor
Holland & Knight LLP
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lauren.maddox@hklaw.com<mailto:lauren.maddox@hklaw.com> | www.hklaw.com<http://www.hklaw.com/>

From: (b) (6) [mailto:(b) (6)]
Sent: Tuesday, January 16, 2018 12:48 PM
To: Maddox, Lauren M (WAS - X75444) <Lauren.Maddox@hklaw.com<mailto:Lauren.Maddox@hklaw.com>>
Cc: Elizabeth Morra <(b) (6) <mailto:(b) (6) >>
Subject: DOT

Lauren,

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(b) (6)
(b) (6)

With

President Trump and his team looking to advance an infrastructure plan in the coming months, it would be a privilege to work with Secretary Chao and her team and put my experience to work. I first met Secretary Chao many years ago when I was working in the Senate for Republican members, helping them push content out the door on their priority issues. I admire her greatly and believe she's going to do great things this year.

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All the best, (b) (6)

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Rodriguez, Susan (CONTR)

From: McCormack, Brian
Sent: Friday, February 16, 2018 8:12 AM
To: jeckard@firstenergycorp.com
Subject: Test

Rodriguez, Susan (CONTR)

From: McCormack, Brian
Sent: Friday, February 16, 2018 8:23 AM
To: Eckard, J. M
Cc: Menezes, Mark; Winberg, Steven; Hynes, Shaylyn
Subject: RE: News Release - FirstEnergy to Deactivate Pleasants Power Station in West Virginia
Attachments: 2018_02_16 Pleasants Power Station Deactivation News Release.pdf

Thanks for sending Mike.

From: Eckard, J. M [mailto:jeckard@firstenergycorp.com]
Sent: Friday, February 16, 2018 11:20 AM
To: McCormack, Brian <Brian.Mccormack@hq.doe.gov>
Subject: FW: News Release - FirstEnergy to Deactivate Pleasants Power Station in West Virginia

Please share. The release was issued as we spoke. Answers to your questions: 1. 100% supplied by Alliance Resources from a West Virginia mine and 2. Pleasants is a non-union plant. (I stand corrected.) Thanks. I'll likely give you another call early next week.

Mike

J. Michael Eckard
Director, Federal Affairs
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FirstEnergy

From: FE News
Sent: Friday, February 16, 2018 11:02 AM
Subject: News Release - FirstEnergy to Deactivate Pleasants Power Station in West Virginia

The attached news release was distributed to the media at 11:00 a.m.

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FirstEnergy Corp.
76 South Main Street
Akron, Ohio 44308
www.firstenergycorp.com

For Release: February 16, 2018

News Media Contact:
Stephanie Walton
(330) 384-2528

Investor Contact:
Irene Prezelj
(330) 384-3859

FirstEnergy to Deactivate Pleasants Power Station in West Virginia
1,300 Megawatts of Generating Capacity Set to Retire in 2019

Akron, Ohio – FirstEnergy Corp. (NYSE: FE) announced that its Allegheny Energy Supply subsidiary today notified PJM Interconnection (PJM), the regional transmission organization, of its plan to deactivate the coal-fired Pleasants Power Station in Willow Island, West Virginia. The 1,300-megawatt (MW) plant will be sold or closed on January 1, 2019. The plant deactivation is subject to PJM's review for reliability impacts, if any.

FirstEnergy subsidiary Mon Power filed a plan in March 2017 seeking regulatory approval to acquire the Pleasants Power Station, which would have resolved a projected 10-year energy capacity shortfall and decreased electric bills for customers. The Federal Energy Regulatory Commission (FERC) rejected the proposal on January 12, 2018. The Public Service Commission of West Virginia approved the sale subject to a number of significant conditions. Those conditions, combined with the FERC rejection, make the proposed transfer unworkable.

"Closing Pleasants is a very difficult choice because of the talented employees dedicated to reliable operation of the station and the communities who have supported the facility for many years. But the recent federal and West Virginia decisions leave FirstEnergy no reasonable option but to expeditiously move forward with deactivation of the plant," said Charles E. Jones, FirstEnergy president and chief executive officer. "We will continue to pursue opportunities to sell the plant while planning for deactivation."

The decision to deactivate the plant impacts approximately 190 employees. Affected employees may be eligible to receive severance benefits through the FirstEnergy severance plan if the plant is closed.

Located along the Ohio River in Willow Island, West Virginia, Pleasants Power Station began operation in 1979. Its two 650-megawatt generating units together produce enough electricity to power approximately 1.3 million homes.

Since 2016, FirstEnergy has announced the sale or closure of 2,471 MW of competitive generation operated in Ohio, Pennsylvania and Virginia. Following the deactivation of the 1,300-megawatt Pleasants plant, the company will own or control generating capacity totaling approximately 14,795 MW from scrubbed coal, nuclear, natural gas and renewable energy facilities across Ohio, Pennsylvania, West Virginia, New Jersey, Virginia and Illinois. FirstEnergy continues to complete the strategic review of its remaining competitive generating fleet.

FirstEnergy is dedicated to safety, reliability and operational excellence. Its 10 electric distribution companies form one of the nation's largest investor-owned electric systems, serving customers in Ohio, Pennsylvania, New Jersey, West Virginia, Maryland and New York. The company's transmission subsidiaries operate more than 24,000 miles of transmission lines that connect the Midwest and Mid-Atlantic regions, while its generation subsidiaries control nearly 16,000 megawatts of capacity from a diversified mix of scrubbed coal, non-emitting nuclear, natural gas, hydro and other renewables. Follow FirstEnergy on Twitter [@FirstEnergyCorp](https://twitter.com/FirstEnergyCorp) or online at www.firstenergycorp.com.

Forward-Looking Statements: This news release includes forward-looking statements based on information currently available to management. Such statements are subject to certain risks and uncertainties. These statements include declarations regarding management's intents, beliefs and current expectations. These statements typically contain, but are not limited to, the terms "anticipate," "potential," "expect," "forecast," "target," "will," "intend," "believe," "project," "estimate," "plan" and similar words. Forward-looking statements involve estimates, assumptions, known and unknown risks, uncertainties and other factors that may cause actual results, performance or achievements to be materially different from any future results, performance or achievements expressed or implied by such forward-looking statements, which may include the following: the ability to experience growth in the Regulated Distribution and Regulated Transmission segments and the effectiveness of our strategy to transition to a fully regulated business profile; the accomplishment of our regulatory and operational goals in connection with our transmission and

distribution investment plans, including, but not limited to, our planned transition to forward-looking formula rates; changes in assumptions regarding economic conditions within our territories, assessment of the reliability of our transmission system, or the availability of capital or other resources supporting identified transmission investment opportunities; the ability to accomplish or realize anticipated benefits from strategic and financial goals, including, but not limited to, the ability to continue to reduce costs and to successfully execute our financial plans designed to improve our credit metrics and strengthen our balance sheet; success of legislative and regulatory solutions for generation assets that recognize their environmental or energy security benefits, including the Notice of Proposed Rulemaking released by the Secretary of Energy and action by the Federal Energy Regulatory Commission (FERC); the risks and uncertainties associated with the lack of viable alternative strategies regarding the Competitive Energy Services (CES) segment, thereby causing FirstEnergy Solutions Corp. (FES), and likely FirstEnergy Nuclear Operating Company (FENOC), to restructure its substantial debt and other financial obligations with its creditors or seek protection under United States bankruptcy laws and the losses, liabilities and claims arising from such bankruptcy proceeding, including any obligations at FirstEnergy Corp.; the risks and uncertainties at the CES segment, including FES, and its subsidiaries, and FENOC, related to wholesale energy and capacity markets and the viability and/or success of strategic business alternatives, such as pending and potential CES generating unit asset sales, the potential conversion of the remaining generation fleet from competitive operations to a regulated or regulated-like construct or the potential need to deactivate additional generating units, which could result in further substantial write-downs and impairments of assets; the substantial uncertainty as to FES' ability to continue as a going concern and substantial risk that it may be necessary for FES, and likely FENOC, to seek protection under United States bankruptcy laws; the risks and uncertainties associated with litigation, arbitration, mediation and like proceedings, including, but not limited to, any such proceedings related to vendor commitments, such as long-term fuel and transportation agreements; the uncertainties associated with the deactivation of older regulated and competitive units, including the impact on vendor commitments, such as long-term fuel and transportation agreements, and as it relates to the reliability of the transmission grid, the timing thereof; the impact of other future changes to the operational status or availability of our generating units and any capacity performance charges associated with unit unavailability; changing energy, capacity and commodity market prices including, but not limited to, coal, natural gas and oil prices, and their availability and impact on margins; costs being higher than anticipated and the success of our policies to control costs and to mitigate low energy, capacity and market prices; replacement power costs being higher than anticipated or not fully hedged; our ability to improve electric commodity margins and the impact of, among other factors, the increased cost of fuel and fuel transportation on such margins; the uncertainty of the timing and amounts of the capital expenditures that may arise in connection with any litigation, including New Source Review litigation, or potential regulatory initiatives or rulemakings (including that such initiatives or rulemakings could result in our decision to deactivate or idle certain generating units); changes in customers' demand for power, including, but not limited to, changes resulting from the implementation of state and federal energy efficiency and peak demand reduction mandates; economic or weather conditions affecting future sales, margins and operations such as a polar vortex or other significant weather events, and all associated regulatory events or actions; changes in national and regional economic conditions affecting us, our subsidiaries and/or our major industrial and commercial customers, and other counterparties with which we do business, including fuel suppliers; the impact of labor disruptions by our unionized workforce; the risks associated with cyber-attacks and other disruptions to our information technology system that may compromise our generation, transmission and/or distribution services and data security breaches of sensitive data, intellectual property and proprietary or personally identifiable information regarding our business, employees, shareholders, customers, suppliers, business partners and other individuals in our data centers and on our networks; the impact of the regulatory process and resulting outcomes on the matters at the federal level and in the various states in which we do business including, but not limited to, matters related to rates; the impact of the federal regulatory process on FERC-regulated entities and transactions, in particular FERC regulation of wholesale energy and capacity markets, including PJM Interconnection, L.L.C. (PJM) markets and FERC-jurisdictional wholesale transactions; FERC regulation of cost-of-service rates; and FERC's compliance and enforcement activity, including compliance and enforcement activity related to North American Electric Reliability Corporation's mandatory reliability standards; the uncertainties of various cost recovery and cost allocation issues resulting from American Transmission Systems, Incorporated's realignment into PJM; the ability to comply with applicable state and federal reliability standards and energy efficiency and peak demand reduction mandates; other legislative and regulatory changes, including the new federal administration's required review and potential revision of environmental requirements, including, but not limited to, the effects of the

United States Environmental Protection Agency's Clean Power Plan, Coal Combustion Residuals regulations, Cross-State Air Pollution Rule and Mercury and Air Toxics Standards programs, including our estimated costs of compliance, Clean Water Act (CWA) waste water effluent limitations for power plants, and CWA 316(b) water intake regulation; adverse regulatory or legal decisions and outcomes with respect to our nuclear operations (including, but not limited to, the revocation or non-renewal of necessary licenses, approvals or operating permits by the Nuclear Regulatory Commission or as a result of the incident at Japan's Fukushima Daiichi Nuclear Plant); issues arising from the indications of cracking in the shield building at Davis-Besse; changing market conditions that could affect the measurement of certain liabilities and the value of assets held in our Nuclear Decommissioning Trusts, pension trusts and other trust funds, and cause us and/or our subsidiaries to make additional contributions sooner, or in amounts that are larger than currently anticipated; the impact of changes to significant accounting policies; the impact of any changes in tax laws or regulations or adverse tax audit results or rulings; the ability to access the public securities and other capital and credit markets in accordance with our financial plans, the cost of such capital and overall condition of the capital and credit markets affecting us and our subsidiaries; further actions that may be taken by credit rating agencies that could negatively affect us and/or our subsidiaries' access to financing, increase the costs thereof, increase requirements to post additional collateral to support, or accelerate payments under outstanding commodity positions, letters of credit and other financial guarantees, and the impact of these events on the financial condition and liquidity of FirstEnergy Corp. and/or its subsidiaries, specifically FES and its subsidiaries; issues concerning the stability of domestic and foreign financial institutions and counterparties with which we do business; and the risks and other factors discussed from time to time in our United States Securities and Exchange Commission (SEC) filings, and other similar factors. Dividends declared from time to time on FirstEnergy Corp.'s common stock during any period may in the aggregate vary from prior periods due to circumstances considered by FirstEnergy Corp.'s Board of Directors at the time of the actual declarations. A security rating is not a recommendation to buy or hold securities and is subject to revision or withdrawal at any time by the assigning rating agency. Each rating should be evaluated independently of any other rating. These forward-looking statements are also qualified by, and should be read in conjunction with the other cautionary statements and risks that are included in our filings with the SEC, including but not limited to the most recent Annual Report on Form 10-K and any subsequent Quarterly Reports on Form 10-Q. The foregoing review of factors also should not be construed as exhaustive. New factors emerge from time to time, and it is not possible for management to predict all such factors, nor assess the impact of any such factor on our business or the extent to which any factor, or combination of factors, may cause results to differ materially from those contained in any forward-looking statements. We expressly disclaim any current intention to update, except as required by law, any forward-looking statements contained herein as a result of new information, future events or otherwise.

(021618)

Rodriguez, Susan (CONTR)

From: Eckard, J. M <jeckard@firstenergycorp.com>
Sent: Friday, February 16, 2018 2:32 PM
To: McCormack, Brian
Cc: Menezes, Mark; Winberg, Steven; Hynes, Shaylyn
Subject: RE: News Release - FirstEnergy to Deactivate Pleasants Power Station in West Virginia

Here's another answer to one of Mr. Menezes' difficult questions: the capacity factor for the Pleasants Power Station in 2017 was 68.56%. That means it ran over two-thirds of the hours throughout the year. My guess was reasonably close. As we speculated though, much of the time the plant was barely covering its marginal cost of production with no contribution to fixed costs. Have a great weekend.

Mike

J. Michael Eckard
 Director, Federal Affairs
 FirstEnergy
 801 Pennsylvania Ave., Suite 310
 Washington, D.C. 20004
 202.434-8153
 202.434-8156 (fax)
 (b) (6) (cell)
jeckard@firstenergycorp.com

FirstEnergy

From: Eckard, J. M
Sent: Friday, February 16, 2018 11:26 AM
To: 'McCormack, Brian' <Brian.Mccormack@hq.doe.gov>
Cc: Menezes, Mark <Mark.Menezes@hq.doe.gov>; Winberg, Steven <Steven.Winberg@hq.doe.gov>; Hynes, Shaylyn <Shaylyn.Hynes@hq.doe.gov>
Subject: RE: News Release - FirstEnergy to Deactivate Pleasants Power Station in West Virginia

Thanks to each of you. Call me on my cell (b) (6)) if you want to discuss further.

Mike

J. Michael Eckard
 Director, Federal Affairs
 FirstEnergy
 801 Pennsylvania Ave., Suite 310
 Washington, D.C. 20004
 202.434-8153
 202.434-8156 (fax)
 (b) (6) (cell)
jeckard@firstenergycorp.com

FirstEnergy

From: McCormack, Brian [<mailto:Brian.Mccormack@hq.doe.gov>]
Sent: Friday, February 16, 2018 11:23 AM
To: Eckard, J. M <jeckard@firstenergycorp.com>
Cc: Menezes, Mark <Mark.Menezes@hq.doe.gov>; Winberg, Steven <Steven.Winberg@hq.doe.gov>; Hynes, Shaylyn <Shaylyn.Hynes@hq.doe.gov>
Subject: [EXTERNAL] RE: News Release - FirstEnergy to Deactivate Pleasants Power Station in West Virginia

Thanks for sending Mike.

From: Eckard, J. M [<mailto:jeckard@firstenergycorp.com>]
Sent: Friday, February 16, 2018 11:20 AM
To: McCormack, Brian <Brian.Mccormack@hq.doe.gov>
Subject: FW: News Release - FirstEnergy to Deactivate Pleasants Power Station in West Virginia

Please share. The release was issued as we spoke. Answers to your questions: 1. 100% supplied by Alliance Resources from a West Virginia mine and 2. Pleasants is a non-union plant. (I stand corrected.) Thanks. I'll likely give you another call early next week.

Mike

J. Michael Eckard
Director, Federal Affairs
FirstEnergy
801 Pennsylvania Ave., Suite 310
Washington, D.C. 20004
202.434-8153
202.434-8156 (fax)
(b) (6) (cell)
jeckard@firstenergycorp.com



From: FE News
Sent: Friday, February 16, 2018 11:02 AM
Subject: News Release - FirstEnergy to Deactivate Pleasants Power Station in West Virginia

The attached news release was distributed to the media at 11:00 a.m.

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Rodriguez, Susan (CONTR)

From: Fisher, Travis
Sent: Thursday, March 01, 2018 12:49 PM
To: Eames, Frederick R.
Subject: RE: Colstrip--Potential for Carbon Sequestration Project

Thanks Fred. I owe you a call. Sorry for not getting back to you--things have been incredibly hectic in my last couple weeks here.

-----Original Message-----

From: Eames, Frederick R. [mailto:feames@hunton.com]
Sent: Wednesday, February 28, 2018 12:29 PM
To: Raggio, Debra <Debra.Raggio@talenergy.com>
Cc: Charles D McConnell <charles.d.mcconnell@rice.edu>; Fisher, Travis <Travis.Fisher@hq.doe.gov>
Subject: Re: Colstrip--Potential for Carbon Sequestration Project

Happy to help in any way. Debra, we have met before. I worked on the Potomac River 202(c) application back in 2005, and worked on the so-called Olson language effort you led. Have spent a lot of time on CCS and 45Q in the past 10 years, and led the 2015 National Coal Council Report.

Travis, best wishes on whatever comes next for you.

And Chuck, thanks for looping me in. See you next week.

Sent from my iPhone

On Feb 28, 2018, at 11:48 AM, Raggio, Debra
<Debra.Raggio@talenergy.com<mailto:Debra.Raggio@talenergy.com>> wrote:

That works for me.

Debra L. Raggio
Senior Vice President | Regulatory & External Affairs Counsel
Talen Energy

From: Charles D McConnell [mailto:charles.d.mcconnell@rice.edu]
Sent: Wednesday, February 28, 2018 11:09 AM
To: Raggio, Debra <Debra.Raggio@talenergy.com<mailto:Debra.Raggio@talenergy.com>>; Fisher, Travis <Travis.Fisher@hq.doe.gov<mailto:Travis.Fisher@hq.doe.gov>>
Cc: 'Eames, Frederick R.' <feames@hunton.com<mailto:feames@hunton.com>>
Subject: RE: Colstrip--Potential for Carbon Sequestration Project

Will be in town to DC on April 11-13 for the National Coal Council BOD meeting. Might be a good time to connect and I copy my colleague Fred Eames from Hunton and Williams who may also be interested to meet you.
THX Travis- will you be in town at that time?

Charles D. McConnell
Executive Director, Energy and Environment Initiative

Rice University, MS 603 | Allen Center, Suite 315A | 6100 Main St., Houston, TX 77005 |
office 713.348.3871 | cell (b) (6) |
fax 713.348.4105 | eei.rice.edu<https://urldefense.proofpoint.com/v2/url?u=http-
3A__eei.rice.edu&d=DwMFAG&c=jxhwBfk-KSV6FFlot0PGng&r=iVm7FWnJ9-HT3nuKthltpmg-
Ux1tlgPR7ds5B78ASem&m=j1Url_TVbmdqWzszk_VAYHkqTW-
frOPETOOY9_4pVMY&s=U2_e0IH859ekwcLLhONwbCahBcErGkVHLz33d3i6NrK&e=> |
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3A__www.facebook.com_RiceEEI_&d=DwMFAG&c=jxhwBfk-KSV6FFlot0PGng&r=iVm7FWnJ9-HT3nuKthltpmg-
Ux1tlgPR7ds5B78ASem&m=j1Url_TVbmdqWzszk_VAYHkqTW-frOPETOOY9_4pVMY&s=GCEghtlnaq4Cuty-
lgBsBX2Zsz1GhA-m7tg53dCxYH0&e=> |

<image001.jpg>

From: Raggio, Debra [mailto:Debra.Raggio@talenenergy.com]
Sent: Monday, February 26, 2018 3:47 PM
To: Fisher, Travis <Travis.Fisher@hq.doe.gov<mailto:Travis.Fisher@hq.doe.gov>>
Cc: Charles D McConnell <charles.d.mcconnell@rice.edu<mailto:charles.d.mcconnell@rice.edu>>
Subject: RE: Colstrip--Potential for Carbon Sequestration Project

Thank you Travis! Chuck I would be interested in picking your brain at some point.

Debra

Debra L. Raggio
Senior Vice President | Regulatory & External Affairs Counsel
Talen Energy

From: Fisher, Travis [mailto:Travis.Fisher@hq.doe.gov]
Sent: Monday, February 26, 2018 4:44 PM
To: Raggio, Debra <Debra.Raggio@talenenergy.com<mailto:Debra.Raggio@talenenergy.com>>
Cc: Charles D McConnell <charles.d.mcconnell@rice.edu<mailto:charles.d.mcconnell@rice.edu>>
Subject: RE: Colstrip--Potential for Carbon Sequestration Project

Hi Debra,

In an effort to shed light on how the Office of Fossil Energy works (I don't understand it fully myself), I'm connecting you with Chuck McConnell, former FE-1 and all around good guy who is in the academic world now. I imagine he has thoughts on CCS and possible applications to Colstrip. Worth a shot anyway.

Best,
Travis

From: Raggio, Debra [mailto:Debra.Raggio@talenenergy.com]
Sent: Monday, February 26, 2018 4:08 PM
To: Fisher, Travis <Travis.Fisher@hq.doe.gov<mailto:Travis.Fisher@hq.doe.gov>>
Subject: Colstrip--Potential for Carbon Sequestration Project

Travis,

It was good talking with you this afternoon. As we discussed, back in 2016, DOE Office of Fossil Energy gave a presentation regarding the Colstrip Power Plant and CO2 capture and sequestration. This issue continues to be raised and I wanted to talk about it further with folks at DOE. If you could direct me to the right people that would be greatly appreciated.

I have enjoyed working with you and wish you all the best. Please do keep in touch.

My best,

Debra

Debra L. Raggio
Senior Vice President | Regulatory & External Affairs Counsel

Talen Energy
117 Oronoco Street
Alexandria, Virginia | 22314
Direct: 703.778.0841 | Mobile: (b) (6) | debra.raggio@talenenergy.com<<mailto:debra.raggio@talenenergy.com>>

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Rodriguez, Susan (CONTR)

From: Winberg, Steven
Sent: Thursday, March 22, 2018 11:57 AM
To: dmoul@firstenergycorp.com; mendenhallk@firstenergycorp.com;
dowlingm@firstenergycorp.com
Subject: JET presentation
Attachments: 170316 JET - DOE presentation - Final.pptx

Don, Mike and Kelly

First, thank you for meeting with DOE a few weeks ago. I was disappointed to hear the news about Pleasants since I started both of those units early in my career.

I sat in on a presentation by a Chinese firm called JET that has an ammonia-based process for SOx control that produces a fertilizer product with no liquid waste stream.

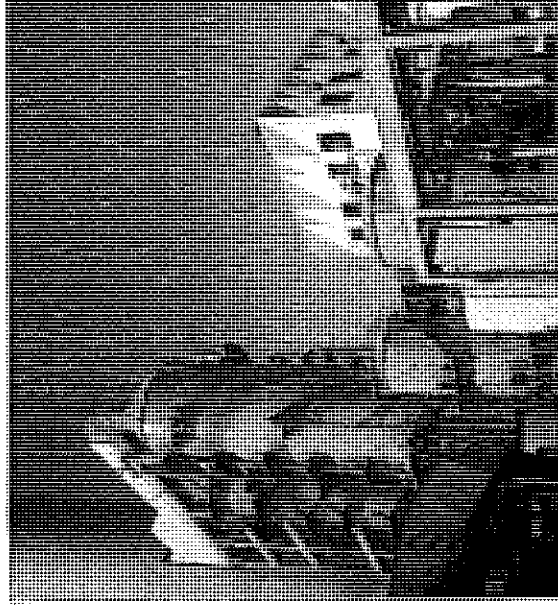
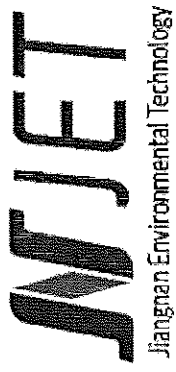
They claim that they will build and operate and will consider build, own and operate.

(b) (5) but I did recall the challenges at Bruce Mansfield (from my days at CONSOL) and thought that I would pass this along to you.

JET's contact info is in the attached presentation.

All the best,

Steven Winberg
Assistant Secretary
Office of Fossil Energy
Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585
202 586 6660



The Role of JET's Air Quality Control Technology in Revitalizing US Coal and Coal Power Industries

March 16th, 2018

Alternative to closing/shuttering coal plants

Provide Additional
Revenue Stream to
Plant

Reduce Plant's
Operating Cost/Increase
Capacity Factor

JET Partnership

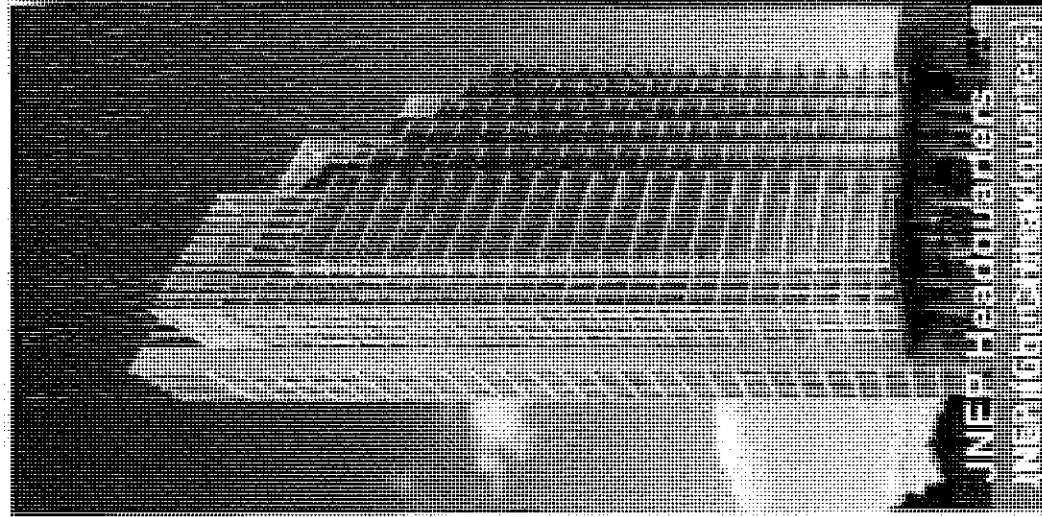
Create Jobs and a
needed byproduct
(fertilizer)

Reduce Plant's
Emissions and
Solid/Liquid Waste

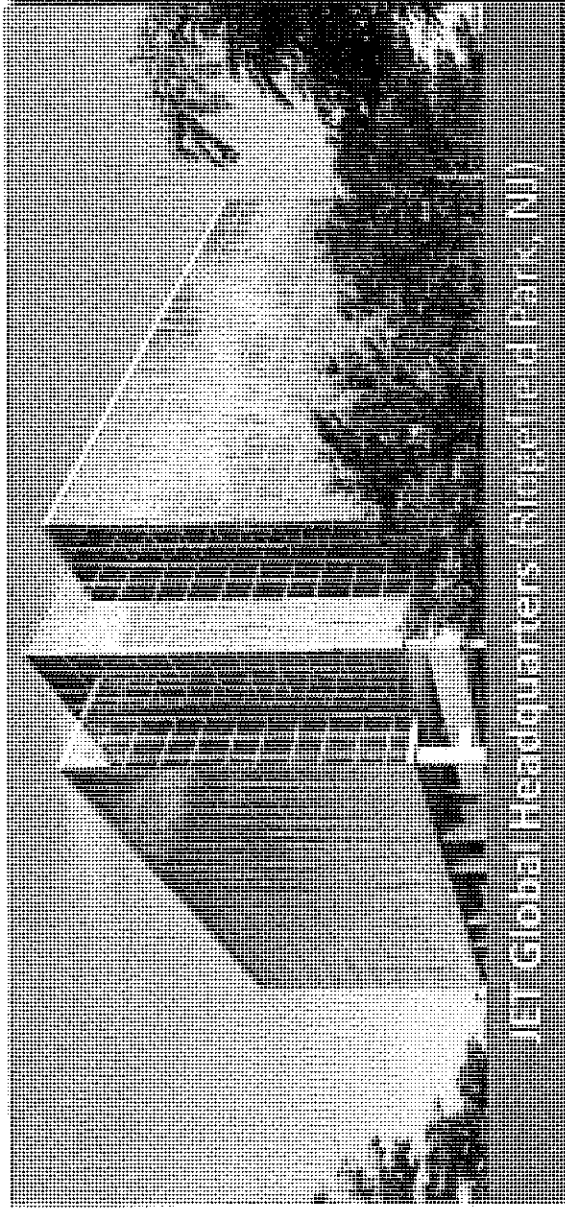
Decrease Capital
Spend

JET's mission is to partner with coal plants
to help achieve long term viability

Introduction to JET



JET Global Headquarters
(Rugby, Warwickshire, UK)



JET Global Headquarters (Rugby, Warwickshire, UK)

Global leader with 80% market share in Ammonia-Based Desulfurization

65 patents and patent applications

150+ projects with more than 300 installed units

Qualifications and Awards

- ☒ Grade A Design Qualification in Environmental Protection Projects
- ☒ Grade A Design Qualification in Chemical Engineering Projects
- ☒ Grade A Operation Qualification for Environmental facilities
- ☒ Contract Qualification for Environmental Projects
- ☒ Certificate of High and New Tech Enterprises
- ☒ ISO 9001 Quality Management System
- ☒ ISO 14001 Environmental Management System
- ☒ OHSAS 18001 Occupational Health and Safety Management System

20 Year History Ammonia Based FGD

1 st Gen	1998	Basic NH ₃ based deSOx	not controlled	~ 70	Meets SO ₂ emission limit
2 nd Gen	2010	NH ₃ based deSOx with NH ₃ recovery control	≥ 97%	< 35	Meets HG2001-2010 standard
3 rd Gen	2013	Fine PM control	≥ 98%	< 17.5	Meets GB13223-2011 special emission limit
4 th Gen	2015	Ultrasound-enhanced deSOx and PM-removal integration	≥ 99%	< 12	Meets ultra-low emission limit

Advantages of Ammonia Based FGD Technology

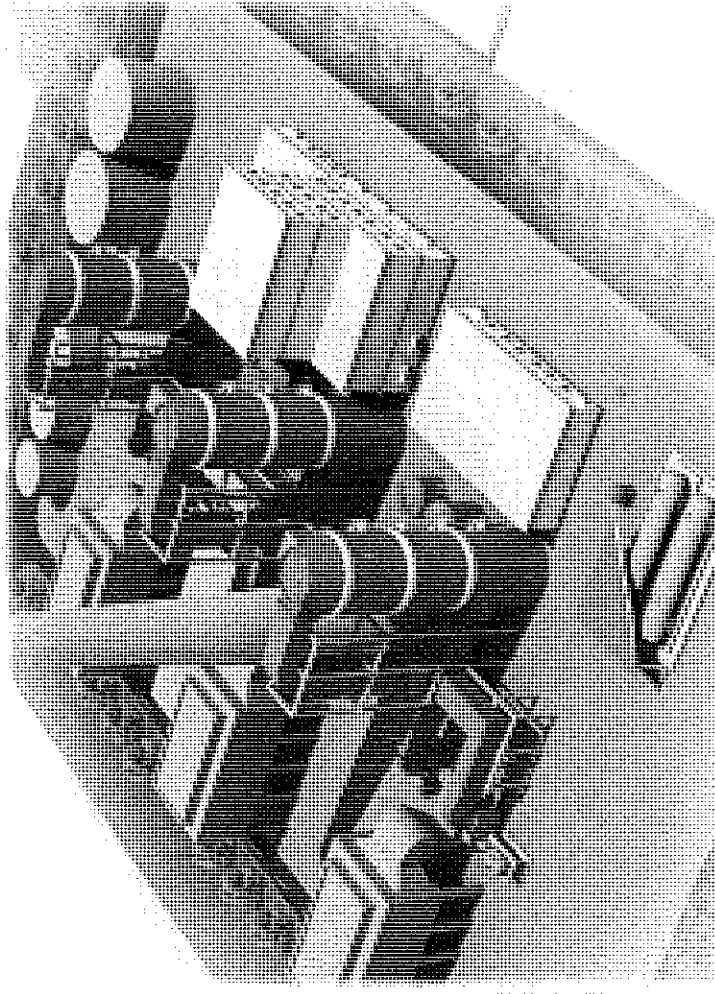
High SO₂ removal efficiency: 99% or higher

Environmentally friendly: no waste water, solid waste or additional CO₂ emissions

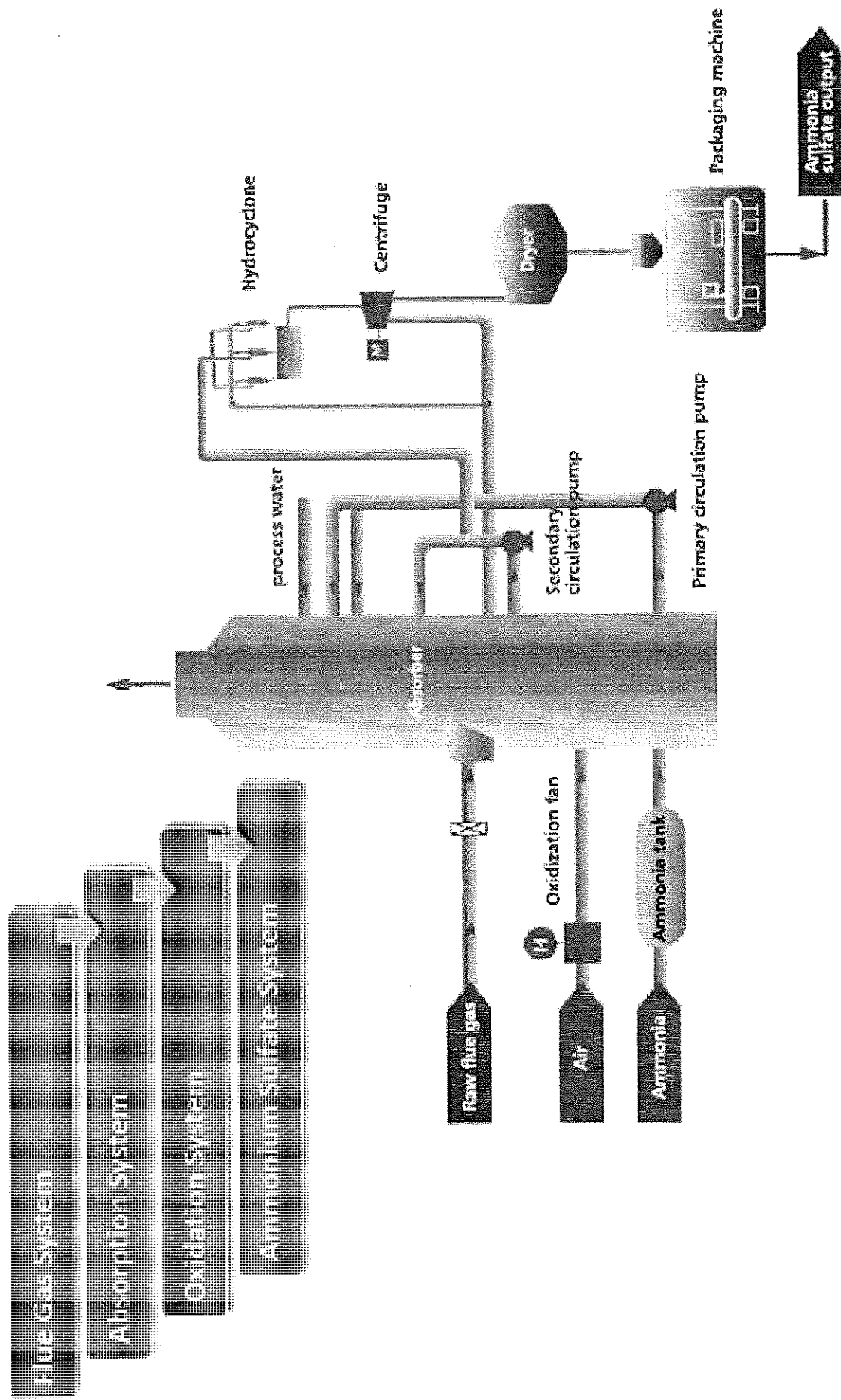
Extra profit: produce 3.8 ton fertilizer per 1 ton ammonia

High turndown ratio: 30 – 110%

Favorable economics: less power consumption & operating cost



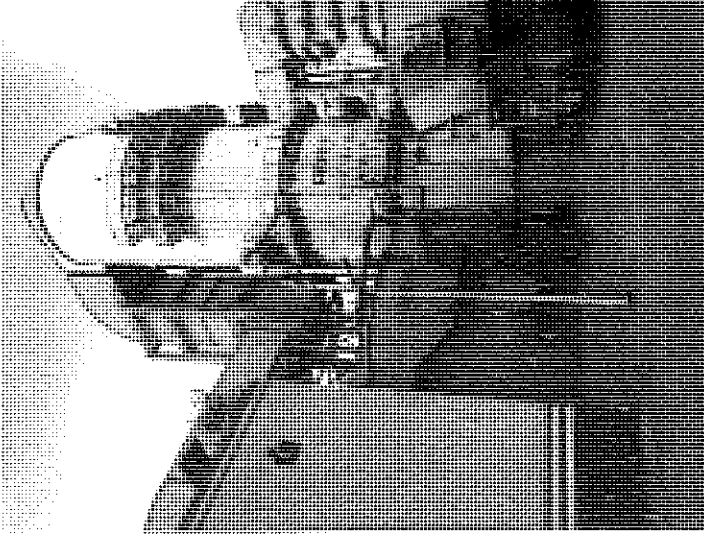
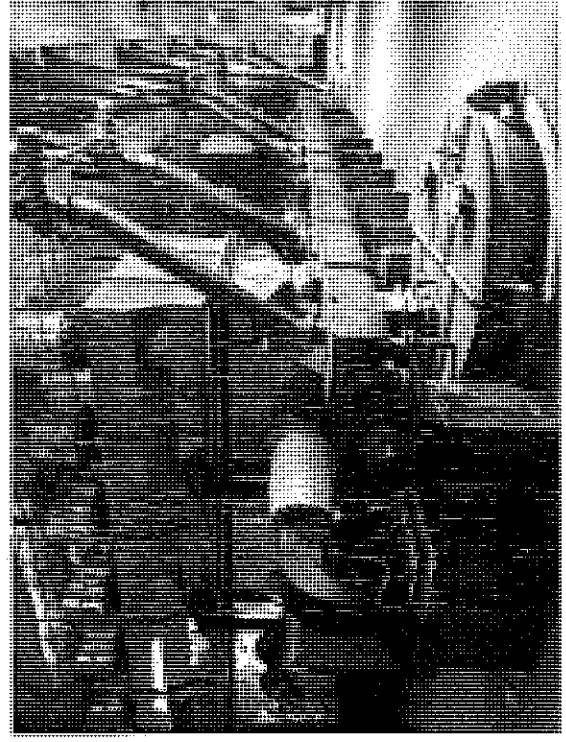
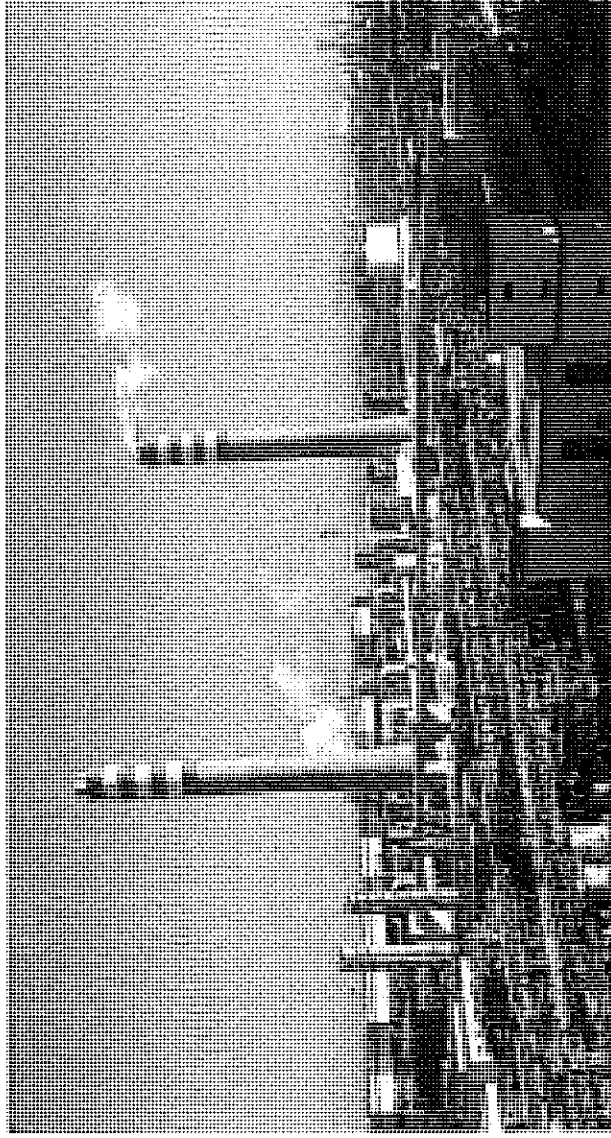
Technology: Process Description



Why Ammonia FGD is a Better Choice than Limestone Processes?

Absorbent	Limestone	Ammonia
By-Product	Gypsum	Ammonium Sulfate Fertilizer
SO₂ Removal Efficiency	≥ 95%	≥ 99%
Waster Water	55 lb/hr / MW	None
CO₂ Emissions	0.7 t/ t SO ₂ Removed	None
Power Consumption	Base	35-50% Less than Base
Operating Cost	Base	Negative (Makes Profit)

Project Pictures – Shenhua Coal Plant



Fertilizer Outlook

“Application of Ammonium Sulfate on diverse crops and growing demand for sulfur as a secondary nutrient are large drivers of the growth in North America. Growing use on specialty crops is a key driver of growth, and blending ammonium sulfate with other nutrients such as urea for additional nitrogen content has also increased.”

-Green Markets Research Report

“As sulfur becomes more and more a factor in cropping systems, there continues to be a need to satisfy the demand with dry fertilizer formulations. The number one choice for sulfur in combination with nitrogen is ammonium sulfate and all interviewees believe this desirability based on economic utility will continue in the foreseeable future.”

-Green Markets Research Report

Fertilizer Outlook

Global Demand of Nitrogen Base Fertilizer

121.254 M Short Tons

Ammonium Sulfate 35% Nitrogen Base

Chemical Composition: 21% Nitrogen, 24% Sulfur

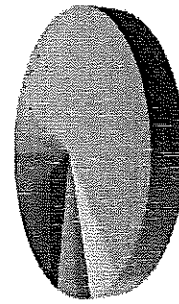
Price Index: 1.00 (Base: 1.00)

Urea 46% Nitrogen Base

Chemical Composition: 46% Nitrogen

Price Index: 1.00 (Base: 1.00)

Global Capacity of Nitrogen Fertilizer (%)



- Ammonia Direct Application
- Urea
- Calc. Amm. Nitrate
- Other Nitrogen
- Other Nitrogen Phosphate
- Ammonium Sulfate
- Ammonium Nitrate
- Nitrogen Solutions
- Ammonium Phosphate
- N. P. K. Compound

Sulfate ion wet deposition
1986



1985 1986 1987

National Atmospheric Deposition Program/Wetland Trends Network
http://nadp.sws.usda.gov

Sulfate ion wet deposition
2012



2011 2012 2013

(b)

(4)

Case Study 1

(b) (4)

Other Case Studies

(b) (4)

Environment Impact from EADs

- The ultra low emission standard in China was developed with the objective to make coal fired plants emissions as clean as natural gas fired plants
 - JET technology allows plants to meet ultra low emission limits
- JET's technology can be used as the first stage in a carbon capture process
- JET is dedicated to eliminating air pollution and improving the living environment through our advanced technology

Alternative to closing/shuttering coal plants

Provide Additional
Revenue Stream to
Plant

Reduce Plant's
Operating Cost/Increase
Capacity Factor

JET Partnership

Create Jobs and a
needed byproduct
(fertilizer)

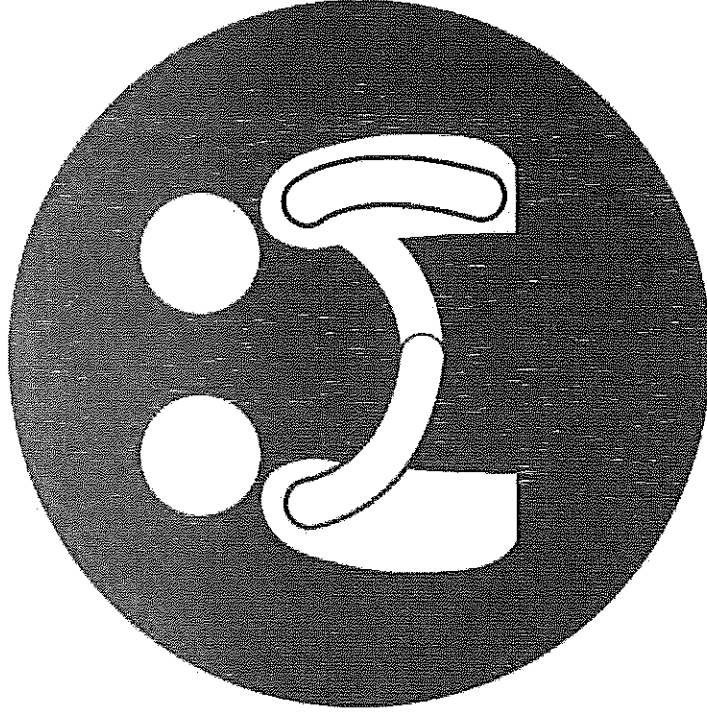
Reduce Plant's
Emissions and
Solid/Liquid Waste

Decrease Capital
Spend

JET's mission is to partner with coal plants
to help achieve long term viability

Thank You!

Questions?



Langdon Environmental Technology Inc.

35 Chalmers Road, Suite 200

Scarborough, Ontario M1V 4Y4

Phone: (416) 298-8871

Email: info@let-inc.com

Website: www.let-inc.com

Rodriguez, Susan (CONTR)

From: Moul, Donald A <dmoul@firstenergycorp.com>
Sent: Monday, March 26, 2018 1:12 AM
To: Dowling, Michael J.
Cc: Winberg, Steven; Mendenhall, Kelley E
Subject: Re: [EXTERNAL] JET presentation

Thanks Steve!

I've forwarded this information to our advisors that are dealing with potential asset sales or investments. We will see if it progresses. I really appreciate the lead.

Regards,
Don

Don Moul
President & CNO
FirstEnergy Solutions Generation Companies
Work: 330-315-6800
Cell: 419-340-8593

> On Mar 25, 2018, at 11:39 PM, Dowling, Michael J. <dowlingm@firstenergycorp.com> wrote:

>

> Thanks, Steve. Much appreciated.

>

> Michael J. Dowling

> Senior VP, External Affairs

> FirstEnergy

> 330-384-5761 office

> (b) (6) mobile

>

>> On Mar 22, 2018, at 2:57 PM, Winberg, Steven <Steven.Winberg@hq.doe.gov> wrote:

>>

>> Don, Mike and Kelly

>>

>> First, thank you for meeting with DOE a few weeks ago. I was disappointed to hear the news about Pleasants since I started both of those units early in my career.

>>

>> I sat in on a presentation by a Chinese firm called JET that has an ammonia-based process for SOx control that produces a fertilizer product with no liquid waste stream.

>> They claim that they will build and operate and will consider build, own and operate.

>> (b) (5) but I did recall the challenges at Bruce Mansfield (from my days at CONSOL) and thought that I would pass this along to you.

>> JET's contact info is in the attached presentation.

>>

>> All the best,

>>

>> Steven Winberg
>> Assistant Secretary
>> Office of Fossil Energy
>> Department of Energy
>> 1000 Independence Avenue, SW
>> Washington, DC 20585
>> 202 586 6660
>>
>>
>> <170316 JET - DOE presentation - Final.pptx>

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Rodriguez, Susan (CONTR)

From: Scherman, William S. <WScherman@gibsondunn.com>
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US Department of Energy

AMH 3/29/2018
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March 29, 2018

Electricity Delivery and
Energy Reliability

VIA COURIER

The Honorable James Richard Perry
Secretary of Energy
United States Department of Energy
1000 Independence Avenue, S.W.
Washington, DC 20585

Re: Request for Emergency Order Pursuant to Federal Power Act Section 202(c)

Dear Secretary Perry:

Pursuant to Section 202(c) of the Federal Power Act ("FPA"),¹ Section 301(b) of the Department of Energy ("DOE") Organization Act,² and certain of the DOE's Rules of Practice and Procedure,³ FirstEnergy Solutions Corp. ("FirstEnergy Solutions"), on behalf of its named subsidiaries ("Applicants"),⁴ respectfully requests that the Secretary of Energy ("Secretary") find that an emergency condition exists in the footprint of the PJM Interconnection, L.L.C. ("PJM") that requires immediate intervention by the Secretary, in the form of a Section 202(c) emergency order directing: (a) certain existing nuclear and coal-fired generators in PJM,⁵ as detailed herein, to enter into contracts and all necessary arrangements with PJM, on a plant-by-plant basis, to generate, deliver, interchange, and transmit electric energy, capacity, and ancillary services as needed to maintain the stability of the electric grid and (b) PJM to promptly compensate at-risk merchant nuclear and coal-fired power plants for the full benefits they provide to energy markets and the public at large, including fuel security and diversity, as detailed herein.

PJM has done little to prevent this emergency despite the numerous signs for many years that the emergency was coming. Nuclear and coal-fired generators in PJM have been closing at a rapid rate⁶—putting PJM's system resiliency at risk—and many more closures have been

¹ 16 U.S.C. § 824a(c).

² 42 U.S.C. § 7151(b).

³ 10 C.F.R. §§ 205.370-205.373.

⁴ The named subsidiaries are: FirstEnergy Generation, LLC, FirstEnergy Nuclear Generation, LLC, FirstEnergy Nuclear Operating Company, and FirstEnergy Generation Mansfield Unit 1 Corp. The foregoing entities are all wholly owned subsidiaries of FirstEnergy Solutions Corp. which, in turn, is a wholly owned subsidiary of FirstEnergy Corp., a publicly-traded, utility holding company headquartered in Akron, Ohio.

⁵ A list of the nuclear and coal-fired generating plants in PJM believed to be currently operating is provided as Attachment A hereto. As explained in Section II.F, only a subset of these plants would be subject to the requested Order.

⁶ In the past four years, over 11,000 MW of coal-fired generation within the PJM footprint has closed, the equivalent of a dozen large power plants. MONITORING ANALYTICS, LLC, 2017 STATE OF THE MKT. REPORT FOR

announced.⁷ PJM continues to claim that all is well with its system,⁸ but at the same time shows it does not have a clear view of what resilience is, how to measure it, or how to ensure it.⁹ PJM has demonstrated little urgency to remedy this problem any time soon¹⁰—so immediate action by the Secretary is needed to alleviate the present emergency.

I. BACKGROUND AND SUMMARY

It is in the national interest to ensure a dependable, affordable, safe, fuel-secure, and clean supply of electricity produced by a diverse array of energy resources, including coal, natural gas, nuclear material, flowing water, and renewable resources. Such diversity of generation enhances dependable and resilient electric supply, reduces electricity price volatility, ensures the Nation's economic and physical security, and promotes economic development. As you stated recently, "America's greatness depends on a reliable, resilient electric grid powered by an 'all of the above' mix of generation resources" that "must include traditional baseload generation with on-site fuel storage that can withstand major fuel supply disruptions caused by natural and man-made disasters."¹¹ Indeed, "[o]ur economy, government and national defense all depend on electricity. Therefore, ensuring a reliable and resilient electric supply and corresponding supply chain are vital to national security."¹²

PJM, VOL. 2: DETAILED ANALYSIS 544 tbl.12-5 (Mar. 8, 2018), (listing coal unit retirements of 2,239 MW, 7,064.8 MW, 243 MW, and 2,038 MW in 2014, 2015, 2016, and 2017, respectively) http://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2017.shtml ("2017 PJM Report").

⁷ See Section II.B, *infra*.

⁸ See, e.g., Comments and Responses of PJM Interconnection, L.L.C. at 4, *Grid Resilience in Regional Transmission Organizations and Independent System Operators*, FERC Docket No. AD18-7-000 (Mar. 9, 2018) ("To be clear, the PJM [Bulk Electric System ("BES")] is safe and reliable today – it has been designed and is operated to meet all applicable reliability standards. However, improvements can and should be made to make the BES more resilient against known and potential vulnerabilities and threats. In many cases, resilience actions are anchored in, but go beyond what is strictly required for compliance with, the existing reliability standards.") ("PJM Comments"); Initial Comments of PJM Interconnection, L.L.C. on the United States Department of Energy Proposed Rule at 25, *Grid Reliability and Resilience Pricing*, FERC Docket No. RM18-1 (Oct. 23, 2017) ("[T]he performance of the PJM system in response to incredibly taxing events like the 2014 Polar Vortex demonstrate the reliability and resilience of the system created by effective transmission planning and development and the energy and capacity markets.").

⁹ See, e.g., PJM Comments at 3-4. *Contrast* Response of the New York System Operator, Inc. at 1, *Grid Resilience in Regional Transmission Organizations and Independent System Operators*, FERC Docket No. AD18-7-000 (Mar. 9, 2018) (referring to "efforts already underway (or being considered) to ensure continued reliable operation and bolster resiliency in response to the evolving nature of the bulk power system in New York").

¹⁰ PJM indicates that it will follow any FERC mandate to study the resiliency issue and, *if* changes are needed, pursue solutions. PJM Comments at 5-6. But the emergency exists presently, not in the future, and immediate action is needed *now*, not more time to study.

¹¹ Letter from Rick Perry, U.S. Sec'y of Energy, to Chairman & Comm'rs of FERC at 1 (Sept. 28, 2017) ("Secretary NOPR Letter").

¹² *Id.* at 2.

The Nation depends heavily on a steady and dependable supply of electricity at all times. Electricity both figuratively and literally powers the Nation—its homes, its businesses, its industries, government buildings, and defense installations. Electricity is thus vital not only to the health, safety, and welfare of the Nation, but also to its economic and physical well-being. Our adversaries understand this too. As explained by Dr. Paul Stockton, former Assistant Secretary of Defense, the Nation's adversaries "may seek to disrupt U.S. defense capabilities by attacking the critical infrastructure on which our military bases rely. . . . The power grid and fuel supplies for power generation are potential targets for these adversaries."¹³ The importance of the electric grid and its fuel supply network to our Nation's well-being cannot be overstated.

Yet, as DOE is undoubtedly aware, threats to the Nation's power supply and grid are real and can no longer be ignored. The Nation's security is jeopardized if DOE does not act now to preserve fuel-secure generation and the diversity of supply.¹⁴ The very diversity of supply that baseload nuclear and coal-fired units provide is being lost more and more each day as more and more of these plants retire because their fuel security and resiliency are not properly recognized and valued by the current administrative market rules. Rather, we, as a Nation, "need to properly recognize the value of each resource, being mindful of its role in our national defense [and] economic security" and, in this regard, "account for the value of on-site fuel storage capability" of nuclear and coal-fired generating resources.¹⁵ To this effect, immediate action is needed to ensure that such traditional baseload generation receives compensation commensurate with the value it provides to the Nation and thus remains in service and available to power the Nation in times of need. As you have noted, "urgent action must be taken to ensure the resilience and security of the electric grid, which is so vitally important to the economic and national security of the United States."¹⁶

The recent cold weather in the East has provided a real-time, real-life demonstration as to why immediate action is so critical to ensure the health and safety of the Nation. From December 27, 2017, through January 8, 2018, the eastern U.S. saw extremely cold temperatures and spiking electric demand, which would likely have been far worse had it occurred only two weeks later after the holiday season ended. If not for the over-performing nuclear and coal-fired generating plants in PJM,¹⁷ the eastern portion of the country would likely have seen grid reliability impacts,

¹³ Comments of Exelon Corp., Testimony of Paul Stockton at 5-6, *Grid Reliability and Resilience Pricing*, FERC Docket No. RM18-1-000 (Oct. 23, 2017).

¹⁴ Secretary NOPR Letter at 8 ("If, for example, we lose our educated workforce or no longer have the ability to build and operate our baseload plants because of short-sighted policies, it will not only weaken our workforce, but will threaten our energy dominance and national security.").

¹⁵ *Id.*

¹⁶ Letter from Rick Perry, U.S. Sec'y of Energy, to Kevin McIntyre, Chairman, FERC at 2 (Dec. 8, 2017) ("Secretary Extension Letter").

¹⁷ See, e.g., Tim Loh, Chris Martin & Naureen S. Malik, *America's Deep Freeze is Aiding Coal and Sending Power Up*, BLOOMBERG (Dec. 28, 2017), <https://www.bloomberg.com/news/articles/2017-12-28/america-s-deep-freeze-is-aiding-coal-and-sending-power-surging> ("In the PJM market . . . coal has once again surged past natural gas to become the biggest fuel for power generation."); Tiffany Hsu, *Deep Freeze in U.S. Creates Heating Squeeze for Homeowners and Utilities*, N.Y. TIMES (Jan. 3, 2018),

as natural gas plants significantly underperformed in large part due to natural gas price spikes and supply interruptions.¹⁸ As a recent DOE study of this cold weather event found (the “NETL Report”), nuclear and coal-fired generation provided 70 percent of output during the event and “coal units in PJM were uniquely positioned to provide the resilience needed at this critical point in time,” providing “74 percent of incremental energy.”¹⁹ The study went on to conclude that:

In the case of PJM, it can also be shown that the demand could not have been met without coal. At peak demand, January 5, 2018, natural gas prices exceeded \$95/MMBtu in eastern PJM. Had coal been removed, a 9-18 GW capacity shortfall would have developed, depending on assumed imports and generation outages, leading to system collapse.²⁰

As the report stated, “[e]xperience with such blackouts indicates the potentially enormous toll in both economic losses and human suffering associated with widespread lack of electricity.”²¹

<https://www.nytimes.com/2018/01/03/business/heating-homeowners-winter.html> (noting that due to high heating demand, “[m]any utilities turned to coal and oil to generate electricity as the price of natural gas, their usual fuel of choice, surged”); Jeremiah Shelor, *Extreme Cold Drives Record-Setting Week in NatGas Cash; Futures See Warm-Up Ahead*, NATURAL GAS INTELLIGENCE (Jan. 5, 2018), <http://www.naturalgasintel.com/articles/112977-extreme-cold-drives-record-setting-week-in-natgas-cash-futures-see-warm-up-ahead> (“With blizzard conditions arriving late in the week along the East Coast just in time to pile on after recent bitterly cold temperatures, natural gas spot price blowouts ran rampant The conditions driving the exorbitant cash prices appeared to be a perfect storm of widespread weather-driven demand and pipeline constraints.”); PJM INTERCONNECTION, PJM COLD SNAP PERFORMANCE DEC. 28, 2017 TO JAN. 7, 2018 13 & fig.10 (Feb. 26, 2018), *available at* <http://www.pjm.com/-/media/library/reports-notice/weather-related/20180226-january-2018-cold-weather-event-report.ashx> (reporting that nuclear and coal generation combined constituted 63% of the online fuel mix during the 2018 cold snap) (“PJM COLD SNAP PERFORMANCE 2018”).

¹⁸ See, e.g., Naureen S. Malik, *Blizzard Triggers 60-Fold Surge in Prices for U.S. Natural Gas*, BLOOMBERG (Jan. 4, 2018), <https://www.bloomberg.com/news/articles/2018-01-04/natural-gas-in-u-s-soars-to-world-s-priciest-as-snow-slams-east>; *Cold Weather, Higher Exports Result in Record Natural Gas Demand*, ENERGY INFO. ADMIN. (“EIA”) (Jan. 5, 2018), <https://www.eia.gov/todayinenergy/detail.php?id=34412> (noting record natural gas demand due in part to recent cold weather); PJM COLD SNAP PERFORMANCE 2018 at 16 (concluding that “[g]as supply issues were the largest” cause of forced outages due to fuel supply issues during the 2018 cold snap, “particularly the weekend of Jan. 6 and Jan. 7, as temperatures reached their lowest points,” and that supply issues “include transportation restrictions and interruptions as well as spot gas commodity availability”).

¹⁹ NAT’L ENERGY TECH. LAB., RELIABILITY, RESILIENCE AND THE ONCOMING WAVE OF RETIRING BASELOAD UNITS VOLUME I: THE CRITICAL ROLE OF THERMAL UNITS DURING EXTREME WEATHER EVENTS 12 (Mar. 13, 2018) (“NETL Report”), *available at* <https://www.netl.doe.gov/research/energy-analysis/search-publications/vuedetails?id=2594>. To the extent necessary, Applicants incorporate the NETL Report by reference as if it were filed in full as an attachment to this Application. The findings in the NETL Report fully support the Secretary determining that an emergency exists within the meaning of FPA Section 202(c) that warrants immediate action.

²⁰ *Id.* at 17 (emphasis added).

²¹ *Id.* at 3.

Overall, DOE estimated that “the value of [coal- and oil-]based power generation resilience” in PJM during this cold weather event was \$3.5 billion.²²

But this is not the first time nuclear and coal-fired generation has saved PJM. In January 2014, a “Polar Vortex” spiked customer demand, dropping system reserves in PJM to just 500 MW (on a demand of over 140,000 MW).²³ PJM calculated that 9,300 MW of generation was unavailable during this event due to interruptions in the natural gas supply to generators.²⁴ While this loss of generating capacity could have been catastrophic, multiple coal-fired generating units slated for retirement were dispatched to meet electric demand²⁵ and nuclear generators also “performed extremely well.”²⁶ “Sixty-five million people within the PJM footprint could have been affected if these traditional baseload units were not available.”²⁷

Combined, the Polar Vortex and this past winter’s extreme cold have shown the value that nuclear and coal-fired generators bring to the electric grid. Just as temperatures plummeted during these periods, the output of nuclear and coal-fired generators spiked. Specifically, during the period December 26, 2017, through January 6, 2018, coal-fired and nuclear generation in PJM averaged output levels of 46,038 MW and 35,485 MW, respectively.²⁸ These levels are over 50 percent greater than the average output of coal-fired generation during the 24 months ending September 2017 (of 29,849 MW) and over 10% greater than the average output of nuclear generation during those 24 months (of 32,167 MW).²⁹ Further, the output levels of coal-fired generators over this 12-day period are well above historical January levels, which tend to see the highest average outputs of such units of any months of the year.³⁰ By any measure, the output of coal-fired and nuclear generating facilities in PJM was exceptional over these recent 12 days.

²² *Id.* at 1, 16.

²³ PJM INTERCONNECTION, ANALYSIS OF OPERATIONAL EVENTS AND MARKET IMPACTS DURING THE JANUARY 2014 COLD WEATHER EVENTS 4 (May 8, 2014), *available at* <http://www.pjm.com/~media/library/reports-noticees/weather-related/20140509-analysis-of-operational-events-and-market-impacts-during-the-jan-2014-cold-weather-events.ashx>.

²⁴ *Id.* at 26.

²⁵ Secretary NOPR Letter at 3.

²⁶ *See id.* (citing U.S. DEP’T OF ENERGY, STAFF REPORT TO THE SECRETARY ON ELECTRICITY MARKETS AND RELIABILITY 95 (Aug. 2017) (“Staff Report”)).

²⁷ Secretary NOPR Letter at 3.

²⁸ *See Generation by Fuel Type*, PJM INTERCONNECTION, http://dataminer2.pjm.com/feed/gen_by_fuel.

²⁹ *See* PJM INTERCONNECTION, STATE OF THE MARKET REPORTS FOR 2012 THROUGH Q3 2017, http://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2018.shtml (as converted from GWh to MW).

³⁰ Specifically, during the three Januaries from 2015 to 2017, coal-fired generation in PJM averaged output of 37,234 MW (and nuclear generation averaged 34,845 MW). *See id.*

The chart below illustrates the spike in nuclear and coal-fired output over this period.³¹ Notably, coal- and oil-fired generation spiked, and nuclear generation rose materially, but gas-fired generation dropped, not only from its average output levels but even from levels seen only a few days prior. As Andrew Ott, PJM's President and CEO, recently testified:

[D]uring this recent cold weather event, obviously more than half of the total supply was coal and nuclear. Certainly, [PJM] couldn't survive without gas; [PJM] couldn't survive without coal; [PJM] couldn't survive without nuclear. [PJM needs] them all in the moment. And I think the key, and what [PJM is] focused on, is each of these bring to the table reliability characteristics. Each of these was online when [PJM] needed them.³²

The strong performance of the nuclear and coal-fired units in PJM was a needed counterbalance to the situation for gas-fired units. Specifically, during the cold snap, dramatic price increases were seen in natural gas prices; including for example a spike in PJM at the Texas Eastern M3 interface, in Southeastern Pennsylvania, from a normal level near \$3/MMBtu to \$96/MMBtu.³³ Further, "in eastern PJM . . . gas and electric transmission were severely constrained, leading to . . . elevated natural gas and electricity prices across [the] region."³⁴ The price increases would have been even more dramatic but for the over performance of nuclear and coal-fired units.

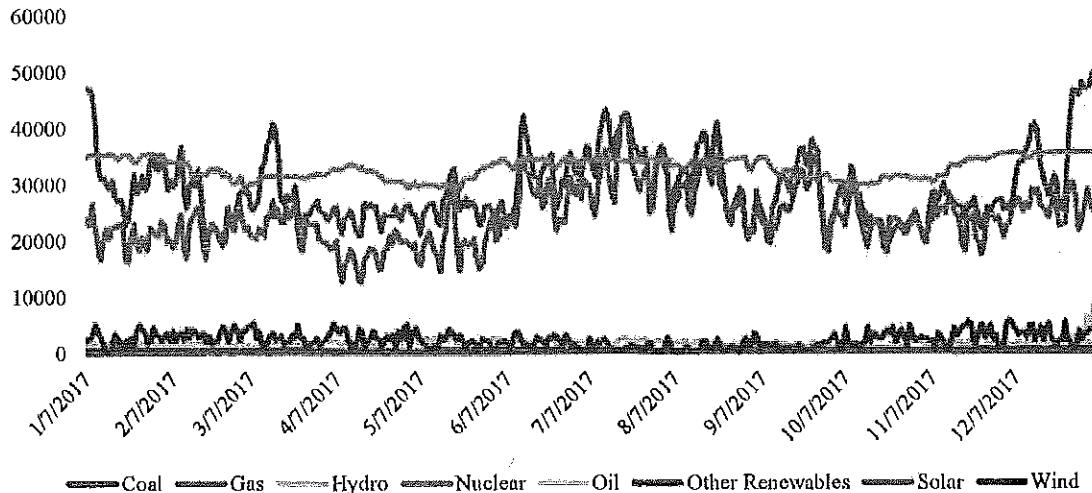
³¹ See *Generation by Fuel Type*, PJM INTERCONNECTION, http://dataminer2.pjm.com/feed/gen_by_fuel. This chart excludes March 29, March 30, and April 2, 2017 because no data was reported for those dates.

³² Press Release, Sen. Lisa Murkowski, Hearing Spotlights Importance of Energy Infrastructure, Diverse Fuel Mix (Jan. 23, 2018) (quoting Andrew Ott), <https://www.murkowski.senate.gov/press/release/hearing-spotlights-importance-of-energy-infrastructure-diverse-fuel-mix>.

³³ NETL Report at 14.

³⁴ *Id.* at 6. See also *id.* at 7 (showing a four-fold increase in daily load weighted average marginal electricity price in PJM between December 30, 2017 and January 6, 2018).

PJM Average Hourly Output By Fuel Type (MW)



But the very same nuclear and coal-fired power plants that allowed PJM to maintain reliability during these extreme weather events are at imminent risk of permanent closure if something is not done *now*. The Energy Information Administration “projects 41 GW of coal and 10 GW of nuclear retirements by 2025,” but, as the NETL Report notes, this projection does not “adequately capture[] the risk” of retirements.³⁵ The report further projects that “as much as 75 GW of coal-fired generation could be retired” by 2025, and notes that another source estimates between “30 and 50 GW of nuclear could face retirement.”³⁶ Without these plants, thousands if not millions of customers could have been without power during sub-zero degree temperatures. And absent immediate and decisive action by DOE, the 11,000 MW of nuclear and coal-fired generation that have kept PJM operating during this period will begin to retire *in the very near future*. As Andrew Ott, PJM’s President and CEO, recently testified, 1,410 MW of nuclear capacity and 3,688 MW of coal-fired capacity that operated during the recent cold snap in the eastern U.S. are scheduled to deactivate within the next five years.³⁷ This testimony is consistent with the NETL Report’s finding that:

The 30 GW of coal that ramped up to meet the surge in PJM load [during the recent cold weather event] clearly includes the units most likely to retire due to insufficient market support, given those units were not running at baseload levels before the event. As more of

³⁵ NETL Report at 25.

³⁶ *Id.* at 30.

³⁷ U.S. Sen. Comm. on Energy and Nat. Res., *The Performance of the Electric Power System in the Northeast and Mid-Atlantic During the Recent Winter Weather Events, Including the Bomb Cyclone*, Questions for the Record Submitted to Mr. Andrew Ott, Response to Question 2 from Sen. Mike Lee (Jan. 23, 2018).

these units retire, the ability of the system to respond to extreme events with reliance, let alone economically, deteriorates.³⁸

Further, it is a matter of public record that FirstEnergy Solutions, which through Applicants indirectly owns 12,300 MW of generation, likely will file for bankruptcy by the end of March 2018.³⁹ Indeed, Charles Jones, CEO of FirstEnergy Corp., recently stated that he would be “shocked” if FirstEnergy Solutions did not file soon.⁴⁰ FirstEnergy Solutions already submitted notice to PJM that it would deactivate its nuclear assets—Davis-Besse and Perry in Ohio and Beaver Valley in Pennsylvania—in 2020 and 2021.

“Distorted price signals” in the organized markets overseen by the Federal Energy Regulatory Commission (“FERC”), such as PJM, “have resulted in under-valuation of grid reliability and resiliency benefits provided by traditional baseload resources, such as [those powered by] coal and nuclear” fuel.⁴¹ As you have recognized, “[b]ecause wholesale pricing in those markets does not adequately consider or accurately value those benefits, generation units that provide the benefits are often not fully compensated for them.”⁴² The NETL Report similarly summarized the problem: “Markets do not currently compensate resilience, and thus that capability is steadily diminishing due to competitive pressures of ongoing, baseload power plant early retirements.”⁴³

This lack of appropriate compensation, among other things, has resulted in the Nation’s nuclear and coal-fired generation closing at an alarming and unprecedented rate. For example “between 2002 and 2016, 531 coal[-fired] generating units representing approximately 59,000 MW of generation capacity retired from the U.S. generation fleet.”⁴⁴ In addition, “[i]t is anticipated that approximately 12,700 MW of coal[-fired generation] will retire through 2020.”⁴⁵ Further, “between 2002 and 2016, 4,666 MW of nuclear generating capacity was announced for

³⁸ NETL Report at 18.

³⁹ Gavin Bade, *FirstEnergy CEO Says Generation Subsidiary Headed for Bankruptcy Protection*, UTILITY DIVE (Feb. 23, 2018), <https://www.utilitydive.com/news/firstenergy-ceo-says-generation-subsidiary-headed-for-bankruptcy-protection/517743/>; Jeffrey Ryser, *FirstEnergy Continues Push Away from Competitive Generation Subsidiary*, PLATTS MEGAWATT DAILY (Feb. 22, 2018).

⁴⁰ Recording of Fourth Quarter 2017 Earnings Webcast, FIRSTENERGY (Feb. 21, 2018), <https://services.choruscall.com/links/fe180221.html> (Mr. Jones stating, at 25:18, “Well, I said in my prepared remarks that I expect that [FES] will be removed from the unregulated money pool between now and the end of March, and that will be the last tie that we have with that business. While I can’t speak for FES, I will be shocked if they go beyond the end of March without some type of a filing.”).

⁴¹ Secretary NOPR Letter at 1.

⁴² *Id.* at 3.

⁴³ NETL Report at 3.

⁴⁴ Secretary NOPR Letter at 2 (citing Staff Report at 22).

⁴⁵ *Id.* (citing EIA, *Monthly Update to the Annual Electric Generator Report*, Form EIA-860m (June 2017), <https://www.eia.gov/electricity/data/eia860m/>).

retirement” and “[e]ight reactors representing 7,167 MW of nuclear capacity . . . have announced retirement plans since 2016.”⁴⁶

These retirements must stop immediately in PJM lest the grid be placed at risk of failure through a lack of generation diversity and over-reliance on generating units that lack secure fuel supply and often compete with other industries and customers for limited firm fuel delivery capabilities. As your staff found, “fuel supply chain disruptions can impact many generators during a single widespread fuel shortage event,” but “[n]uclear and coal[-fired power] plants typically have advantages associated with onsite fuel storage. . . .”⁴⁷ Such generating units with on-site storage capacity kept PJM from shedding load during the 2014 Polar Vortex when available generating capacity was only a hair’s width more than demand. And such units have been critical to keeping the grid supplied during the severe cold weather in the East this past winter. But the continued existence of such fuel-secure, baseload units cannot be taken for granted. Unless immediate action is taken, they will continue to retire and PJM and the Nation are likely not to be so lucky as to avoid load-shedding (or worse) the next time generation supply is stretched to its limit.

FERC has for several years failed to heed this warning and to act to prevent this impending crisis. Indeed, FERC has had the opportunity to prevent this crisis on numerous occasions, including the opportunity you provided it through your Notice of Proposed Rulemaking (“NOPR”) issued pursuant to FPA Section 403.⁴⁸ Although you granted FERC’s request to extend the NOPR proceeding, you stated that you would continue to examine “all options within [your] authority under the *Department of Energy Organization Act*, the *Federal Power Act*, and any other authorities to take remedial action as necessary to ensure the security of the nation’s electric grid.”⁴⁹

Despite the fact that the time for such remedial action has come, FERC terminated your rulemaking proceeding and chose instead merely to study the issue further.⁵⁰ And although FERC acknowledged that “resilience remains an important issue that warrants the Commission’s continued attention,”⁵¹ it dismissed evidence establishing the threat to resilience posed by the

⁴⁶ *Id.* at 3 (citing Staff Report at 29-30).

⁴⁷ Staff Report at 91. *See also* NETL Report at 14 (“As for natural gas-fired electricity generation, two significant constraints inhibit its fuel resilience contribution during extreme weather events Most importantly, demand from competing sectors, especially from residential and commercial space heating, takes priority over electricity for natural gas use, limiting and even diminishing the capacity potential for natural gas-based electricity. Compounding this constraint is that of pipeline capacity. Even though abundant natural gas may be available, it must flow through the same limited pipeline capacity already delivering to increased heating demand.”).

⁴⁸ *See generally* Secretary NOPR Letter. *See also* NETL Report at 3 (“The need for reasonable compensation to maintain resilient capacity to endure such periodically-certain threats to the nation formed the basis of [DOE’s] resilience compensation proposal to [FERC].”).

⁴⁹ Secretary Extension Letter at 2 (*italics in original*).

⁵⁰ *Grid Reliability and Resilience Pricing et al.*, 162 FERC ¶ 61,012 (2018).

⁵¹ *Id.* at P 13.

imminent loss of additional nuclear and coal-fired generation and found instead that “the extensive comments submitted by the [regional transmission organizations and independent system operators (“RTOs/ISOs”)] do not point to any past or planned generator retirements that may be a threat to grid resilience.”⁵² Further, FERC concluded that it lacked the legal authority to act on your proposed rule for lack of a showing that current rules were unjust or unreasonable.⁵³

FERC’s response was disappointing. FERC’s reliance on comments by RTOs/ISOs—the very entities that preside over the flawed markets—is misplaced.⁵⁴ More fundamentally, FERC’s decision to study the issue further is too little, too late. As Commissioner Chatterjee noted, “[m]ajor regulatory reform efforts often can take several years to complete.”⁵⁵ The record before FERC, however, demonstrated that the time to act is now. Multiple commenters expect that the trend of premature, economic retirement of nuclear and coal-fired generators will continue if left unaddressed.⁵⁶ Indeed, seven nuclear units (representing 10,500 MW of nameplate capacity) are planning to retire by 2025.⁵⁷ And owners of other nuclear units have stated publicly that they do not intend to invest further in their nuclear units unless and until their host states pass legislation that subsidizes the units.⁵⁸

Even more troubling is that PJM has followed FERC’s lead and decided to kick the can down the road on this critical issue. In its Comments and Responses to FERC’s initiation of a new proceeding on grid resilience, PJM concludes that its bulk electric system “is safe and reliable today—it has been designed and is operated to meet all applicable reliability standards.”⁵⁹ While PJM acknowledged that “generation and other resources” supply essential attributes that support reliability and that “the maintenance or assurance of these attributes into the future are important to resilience mitigation,” PJM has committed to nothing more than further study of the issue.⁶⁰ And PJM’s position is all the more questionable in light of its admission that it does not conduct

⁵² *Id.* at P 15.

⁵³ *Id.* at P 14 (“For the reasons discussed below, the Proposed Rule did not satisfy those clear and fundamental legal requirements under section 206 of the FPA. Given those legal requirements, we have no choice but to terminate Docket No. RM18-1-000.”).

⁵⁴ Among other justifications for taking no action, FERC noted that the RTOs, and the industry more generally, do not have a clear definition or understanding of the resilience issue. *Id.* at P 22. As such, FERC’s decision to take no action was based on incomplete information.

⁵⁵ *Id.* at Chatterjee Concurrence.

⁵⁶ *Id.*

⁵⁷ *Id.*

⁵⁸ Public Service Enterprise Group Inc., SEC Form 8-K, at 2 (Feb. 28, 2018).

⁵⁹ PJM Comments at 4.

⁶⁰ *Id.* at 46 (“PJM will need to continue to conduct analysis of the anticipated future availability of these attributes so that it can proactively address the maintenance of these attributes through the markets. PJM will also consider the operational lessons learned from other RTOs in regard to resource mix and essential resource attributes to continue to analyze future trends in resource mix and their impacts on both reliability and resilience.”).

system planning or operations subject to formal resilience criteria, and that it would need additional FERC authorization in order to do so.⁶¹

PJM's conclusion misses the point. As you noted, "urgent action must be taken to ensure the resilience and security of the electric grid."⁶² It is insufficient and wholly illogical to say that action is not needed going forward because PJM meets today's reliability criteria. PJM's comments demonstrate that it has yet to identify and measure resilience, much less taken steps to preserve the resilience of its electric grid.⁶³ Indeed, many of PJM's requests to the Commission do nothing more than pass the buck back to FERC on this critical issue.⁶⁴

Further, PJM's requests for action "to enhance resilience of the grid and interrelated systems"⁶⁵ will not address your concerns regarding the resilience and security of the Nation's electric grid. These requests, which call for additional FERC proceedings and RTO/ISO filings, in some cases require no action by any party for nine to twelve months *after the conclusion of the current FERC proceeding* and will do nothing to stem the tide of premature nuclear and coal-fired plant closures in the interim.⁶⁶ This is particularly alarming because PJM acknowledges that its Capacity Performance changes have failed to produce a long-term solution "to meet the ever-growing demand for gas transportation by the generation sector."⁶⁷ Indeed, natural gas availability

⁶¹ *Id.* at 33-34.

⁶² Secretary Extension Letter at 2.

⁶³ *See, e.g.*, PJM Comments at 37 ("Because PJM does not have formal resilience criteria, PJM adapts existing analyses . . . to derive conclusions about the ability of the PJM BES to withstand a high-impact, low-frequency event, and is working with stakeholders to determine how best to incorporate resilience into PJM's planning process and what criteria should be used."); *id.* at 66 ("RTO wholesale electricity, Ancillary Service markets, capacity markets, and shortage pricing mechanisms were not originally designed specifically with resilience in mind.").

⁶⁴ *See, e.g., id.* at 5 (requesting that FERC "[a]rticulate in this docket that the regional planning responsibilities of RTOs . . . includes an obligation to assess resilience"); *id.* (requesting that FERC "[e]stablish a Commission process . . . that would allow an RTO to receive verification as to the reasonableness of its assessments of vulnerabilities and threats").

⁶⁵ *See* PJM Comments at 5-8.

⁶⁶ *See, e.g., id.* at 6 ("Request that all RTOs . . . submit a subsequent filing . . . to implement resilience planning criteria, and develop processes for the identification of vulnerabilities, threat assessment and mitigation, restoration planning, and related process or procedures needed to advance resilience planning."); *id.* ("Request that all RTOs . . . submit a subsequent filing, including any necessary proposed tariff amendments, for any proposed market reforms and related compensation mechanisms to address resilience concerns within nine to twelve months from the issuance of a Final Order in this docket.").

⁶⁷ *Id.* at 57-58 ("Although PJM was hoping that the Capacity Performance changes would spur a corresponding array of new service offerings by pipelines (and generators seeking such options), at least on the public record such new pipeline services have not been offered as new open season requests [N]ew flexible services, to the extent they have been offered, appear to have been confined to the secondary market in which available gas from LDCs or industrial customers is made available, for a price, on the non-transparent bilateral secondary market. Although this is an effective short term strategy to 'move around' available capacity and take advantage of diversity in demand, it cannot, in the long run, serve as the sole means to meet the ever-growing demand for gas transportation by the generation sector."). PJM's admission that the Capacity Performance program fell short

during the recent cold weather in the eastern U.S. has prompted PJM to consider enacting emergency operational cost procedures for use when emergency conditions affect the grid or gas pipeline system.⁶⁸ PJM's efforts to "to engage interstate pipelines and LDCs to review gas pipeline contingencies"⁶⁹ similarly have failed to produce a long-term solution.

The lack of protection for at-risk nuclear and coal-fired plants during this time actually undermines the effectiveness of other PJM requests. For example, PJM requests that FERC require it to file proposed tariff amendments "to permit non-market operations during emergencies," which "could includ[e] provisions for cost-based compensation when the markets are not operational or when a wholesale supplier is directed to take certain emergency actions by PJM for which there is not an existing compensation mechanism."⁷⁰ FERC's and PJM's inaction, however, has significantly increased the risk that the very plants needed to take these emergency actions will have shuttered by the time PJM files and FERC approves these tariff provisions.

These events demonstrate that, absent immediate intervention by the Secretary, nuclear and coal-fired plants will continue to retire prematurely. In view of this regulatory failure, and as further detailed herein, Applicants seek action from the Secretary to ensure the continued operation of baseload nuclear and coal-fired power plants in PJM. Such immediate action is necessary to address an emergency in the bulk power system overseen by PJM and to serve the public interest by preventing power disruptions and system blackouts. Absent such an order, health care facilities, emergency services, and other critical infrastructure could be without power affecting portions of the 65 million people that reside within the PJM footprint.

contrasts sharply with its prior assurances to FERC that the Capacity Performance program would result in firm fuel supply. PJM Interconnection, L.L.C., Reforms to the Reliability Pricing Market ("RPM") and Related Rules in the PJM Open Access Transmission Tariff ("Tariff") and Reliability Assurance Agreement Among Load Serving Entities ("RAA") at 53, FERC Docket No. ER15-623-000 (Dec. 12, 2014) ("Capacity Market Sellers that now will face more harsh financial consequences for a failure to perform during emergencies (with no limit on when such emergencies arise) will likely need to invest in plant design changes or new equipment, or increase operating budgets to accommodate more staff, firm fuel delivery arrangements, greater inventories, or changed operating practices.").

⁶⁸ Jared Anderson, *PJM Mulls Emergency Operational Cost Issues*, PLATTS MEGAWATT DAILY (Jan. 10, 2018).

⁶⁹ PJM COLD SNAP PERFORMANCE 2018 at 21-22.

⁷⁰ PJM Comments at 6.

II. APPLICATION FOR EMERGENCY ORDER

In the United States, RTOs work to ensure the operation and security of the bulk electric power system. PJM operates the electric grid and centralized electricity markets in all or part of 13 different states and the District of Columbia,⁷¹ overseeing over 178,000 MW of installed capacity and serving approximately 65 million people.⁷² Over half of PJM's generating capacity is nuclear and coal-fired generation,⁷³ and nearly one-quarter of the Nation's nuclear and coal-fired generating capacity is located within PJM.⁷⁴

PJM's power markets, however, consistently fail to compensate nuclear and coal-fired generators for the full value of the benefits that they provide, such as fuel security and diversity. As stated by a former Commissioner of FERC, "I believe that fuel diversity is really key in ensuring reliability going forward, even in these dynamic times . . . [I]t is imperative that we protect fuel diversity."⁷⁵ Such continued fuel diversity in PJM, however, is at risk.

PJM's independent market monitor recently found that between six and nine nuclear plants, with a total capacity of 7,058 MW to 14,027 MW, did not recover their avoidable costs—the costs to keep the generators operating—in two of the last three years.⁷⁶ Additionally, four nuclear plants, with capacity of 3,554 MW, are not expected to recover their annual avoidable costs on average from 2018 through 2020.⁷⁷ The market monitor similarly found that a "significant number of coal units are at risk of retirement" because 17,302 MW of coal-fired capacity is expected to receive less than 90 percent of its avoidable costs.⁷⁸ Overall, the market monitor found that, in addition to units currently planning to retire, between 22,929 MW and 30,785 MW of capacity in PJM,

⁷¹ PJM's territory includes all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia, and the District of Columbia. *Who We Are*, PJM, <http://www.pjm.com/about-pjm/who-we-are.aspx> (last visited Mar. 22, 2018); *PJM's Mission & Vision*, PJM, <http://www.pjm.com/about-pjm/who-we-are/mission-vision.aspx> (last visited Mar. 22, 2018).

⁷² *Capacity by Fuel Type*, PJM (June 1, 2017), <http://www.pjm.com/-/media/markets-ops/ops-analysis/capacity-by-fuel-type-2017.ashx?la=en>; *Who We Are*, PJM, <http://www.pjm.com/about-pjm/who-we-are.aspx> (last visited Mar. 22, 2018).

⁷³ *Capacity by Fuel Type*, PJM (June 1, 2017) (showing nuclear and coal-fired generation represent 19% and 33% of PJM's installed generation capacity, respectively).

⁷⁴ *Compare id.* (showing that nuclear and coal-fired generation represent 33,992 MW and 59,835 MW of PJM's installed generation capacity, respectively), with *Preliminary Monthly Generator Inventory*, EIA (June 2017), <https://www.eia.gov/electricity/data/eia860m/> (showing, when filtered by "Technology," 284,439 MW of conventional steam coal generator nameplate capacity and 104,628 MW of nuclear generator nameplate capacity as of June 2017 nationwide).

⁷⁵ *Oversight of the Federal Energy Regulatory Commission: Hearing Before the Subcomm. on Energy and Power*, 114th Cong., Prelim. H'rg Tr. at 54 (2015) (testimony of Colette D. Honorable, Commissioner, FERC).

⁷⁶ 2017 PJM Report at 2.

⁷⁷ *Id.*

⁷⁸ *Id.*

primarily from nuclear and coal-fired generation, is at risk of retirement.⁷⁹ In fact, the market monitor found that over 90 percent of the “at-risk” generation in PJM was either nuclear or coal-fired.⁸⁰ But new nuclear and coal-fired generation will not replace this lost capacity because, as the market monitor found, “[i]n 2017 . . . a new coal plant and a new nuclear plant would have been significantly unprofitable.”⁸¹

By contrast, nearly all oil, natural gas, hydroelectric, and pumped storage generators recovered fully their avoidable costs in 2017.⁸² This marked difference is a result of the fact that nuclear and coal-fired units are baseload plants. As such, they are designed to run “24/7” on a consistent basis with 25 days of on-site fuel availability (when running “full bore”), making them the backbone of the electric system.⁸³ PJM’s energy market, though, is designed not to consider or incentivize operational diversity, fuel security, or system resiliency. Rather, it dispatches generation units based only on short-term marginal price without regard for the fixed costs of the facility, or the firmness of its fuel supply or transportation. Specifically, PJM uses a reliability-constrained least-cost model to dispatch the lowest-cost units required to satisfy electricity demand.⁸⁴ But because nuclear and coal-fired units are designed to run continuously, they often continue to operate through lower-priced periods—such as the middle of the night—sometimes requiring them to sell their electricity output at a loss. This is particularly true in states with large amounts of wind-powered generation, as wind tends to generate at its peak overnight when electricity demand is low.⁸⁵ The unavoidable requirement to operate during lower-priced periods places significant financial strain on baseload units such as nuclear and coal-fired generators that are not properly compensated in the existing markets.⁸⁶ All indications are that these trends will continue.

⁷⁹ *Id.*

⁸⁰ *Id.* at tbl.7-36.

⁸¹ *Id.* at 6.

⁸² *Id.* at tbl.7-30.

⁸³ See N. AM. ELEC. RELIABILITY CORP., POLAR VORTEX REVIEW 36-37 (Sept. 2014), http://www.nerc.com/pa/rrim/January%202014%20Polar%20Vortex%20Review/Polar_Vortex_Review_29_Sep_t_2014_Final.pdf (“[A] growing dependence on gas-fired generation can increase the [bulk power system’s] exposure to disruptions from insufficient fuel supply, transportation, and delivery. . . . Unlike coal and fuel oil, natural gas is not easily stored on site.”). Cf. PJM INTERCONNECTION, PJM’S EVOLVING RESOURCE MIX AND SYSTEM RELIABILITY 35 (Mar. 30, 2017) (“[R]ecent studies, including the Black Sky/Black Start Protection Initiative, suggest that 30 days of fuel inventory would be required to adequately respond to Black Sky type events.”).

⁸⁴ See *Market for Electricity*, PJM, <http://learn.pjm.com/electricity-basics/market-for-electricity.aspx> (last visited Mar. 22, 2018).

⁸⁵ See, e.g., Scott DiSavino, *Texas Power Demand to Hit 2016 Peak Amid Heat Wave: ERCOT*, REUTERS (Aug. 4, 2016), <http://www.reuters.com/article/us-usa-texas-power-heatwave-idUSKCN10F202> (noting that wind generation in ERCOT “typically produce[s] most energy overnight”).

⁸⁶ Markets only provide signals that lead to efficient decisions on the part of market participants if the markets “efficiently price all valuable services provided to the system.” FirstEnergy Reply Comments, Ex. 1 (“Hunger Reply Aff.”) at 9, *Grid Resiliency Pricing Rule*, FERC Docket No. RM18-1-000 (Nov. 7, 2017).

PJM's market monitor cursorily dismissed this undeniable trend of nuclear and coal-fired generation retirements because of under-recovery, stating that "[m]any generating plants have retired in PJM since the introduction of markets and many generating plants have been built since the introduction of markets" and that "[t]he fact that some plants are uneconomic does not call into question the fundamentals of PJM markets."⁸⁷ This response is alarming to say the least. Nuclear and coal-fired generation provides substantial resilience and security benefits to the electric grid and to the Nation. Indeed, as the market monitor itself recognized, "[s]ignificant reliance on specific fuels, including nuclear, coal and gas means that markets are at risk from a significant disruption in any one fuel."⁸⁸ By treating the lost nuclear and coal-fired capacity the same as the non-nuclear and non-coal-fired capacity that has replaced it, the market monitor ignores the significant threat to the electric grid and the Nation's security posed by the loss of resilient, fuel-secure baseload generation.

As explained below, Applicants request that DOE determine that an emergency exists in PJM within the meaning of FPA Section 202(c) with respect to a threat to energy security and reliability, and thus direct the subject baseload nuclear and coal-fired generators to enter into contracts and all necessary arrangements with PJM, on a plant-by-plant basis, to generate, deliver, interchange, and transmit electric energy, capacity, and ancillary services to maintain fuel diversity and grid dependability and resiliency within the PJM region.

A. The Secretary's Authority Under Section 202(c) of the Federal Power Act

Section 202(c) of the Federal Power Act grants the Secretary the authority to determine "that an emergency exists by reason of a sudden increase in the demand for electric energy, or a shortage of electric energy or of facilities for the generation or transmission of electric energy,"⁸⁹ and, once such a determination is made, "to require by order such temporary connections of facilities and such generation, delivery, interchange, or transmission of electric energy as in [his] judgment will best meet the emergency and serve the public interest."⁹⁰

The Secretary's authority and discretion under Section 202(c) is quite broad and is not limited to emergencies caused by war or limited in duration. Section 202(c) states that it may be invoked during times of war or during emergencies, and empowers the Secretary "whenever [he] determines that an emergency exists by reason of" certain specified market conditions "or other causes" to order actions "as in [his] judgment will best meet the emergency and serve the public interest."⁹¹

⁸⁷ 2017 PJM Report at 2.

⁸⁸ *Id.* at 5.

⁸⁹ 16 U.S.C. § 824a(c)(1).

⁹⁰ *Id.*

⁹¹ *Id.* The legislative history of Section 202(c) confirms this interpretation, explaining that in crisis conditions DOE should be "ready to do all that can be done in order to prevent a break-down in electric supply." S. Rep. No. 74-621, at 49.

DOE's regulations define emergency broadly, stating that an emergency "can result from a sudden increase in customer demand, an inability to obtain adequate amounts of the necessary fuels to generate electricity, or a regulatory action which prohibits the use of certain electric power supply facilities."⁹² In addition, the regulation also states that "[e]xtended periods of insufficient power supply as a result of inadequate planning or the failure to construct necessary facilities can result in an emergency"⁹³

The current situation in PJM constitutes such an emergency.

B. An Emergency Exists Due to the Recent and Imminent Critical Reduction in Nuclear and Coal-Fired Generation Capacity

The Nation's bulk electric system is undergoing rapid change. As the DOE recently recognized, the provision of electricity provides various benefits that are not recognized or compensated by the markets created by these politically driven actions:

Society places value on attributes of electricity provision beyond those compensated by the current design of the wholesale market.

- Americans and their elected representatives value the various benefits specific power plants offer, such as jobs, community economic development, low emissions, local tax payments, resilience, energy security, or the national security benefits associated with a nuclear industrial base. Most of these benefits are not recognized or compensated by wholesale electricity markets.⁹⁴

Indeed, the DOE's January 2017 Quadrennial Energy Review states that "[s]hort-run markets may not provide adequate price signals to ensure long-term investments in appropriately configured capacity" and "resource valuations tend not to incorporate superordinate network and/or social values such as enhancing resilience into resource or wires investment decision making."⁹⁵ IHS Energy has found that, as a result of this "missing money" problem, "the loss of

⁹² 10 C.F.R. § 205.371.

⁹³ *Id.*

⁹⁴ Staff Report at 11.

⁹⁵ U.S. DEP'T OF ENERGY, TRANSFORMING THE NATION'S ELECTRICITY SYSTEM: THE SECOND INSTALLMENT OF THE QUADRENNIAL ENERGY REVIEW 4-41 (January 6, 2017), available at <https://www.energy.gov/sites/prod/files/2017/02/f34/Quadrennial%20Energy%20Review--Second%20Installment%20%28Full%20Report%29.pdf>.

power supply diversity is accelerating because too many power plants are retiring before it is economic to do so.”⁹⁶

This market failure is reaching a crisis point. Dr. David Hunger, a former FERC Staff member and Vice President within the Energy Practice of Charles River Associates, found that “there were more [generator] retirements in the seven-year period from 2010 to 2016 (457 units) than in the 20-year period from 1990 to 2009 (358 units). Likewise, the quantity of nuclear and coal-fired generation capacity retired in 2010-2016 (68,540 MW nameplate) was more than double that in the prior 20 years, 1990-2009 (26,721 MW nameplate).”⁹⁷ As the DOE concluded, “[g]enerator profitability could become a public policy concern if so much generation is financially challenged that the reliability or resilience of the [bulk power system] become threatened.”⁹⁸ The rash of nuclear and coal-fired generator closings and other recent events in PJM are evidence that it already is a public policy concern. But these are not the only warning signs.

January 2014 Polar Vortex in PJM: A severe cold snap spiked customer demand, dropping system reserves in PJM to just 500 MW (on a demand of over 140,000 MW).⁹⁹ PJM calculated that 9,300 MW of generation was unavailable during this event due to interruptions in the natural gas supply to generators.¹⁰⁰ While this loss of generating capacity could have been catastrophic, multiple coal-fired generating units slated for retirement were dispatched to meet electric demand¹⁰¹ and nuclear generators also “performed extremely well.”¹⁰² “Sixty-five million people within the PJM footprint could have been affected if these traditional baseload units were not available.”¹⁰³

Extreme Cold in December 2017 and January 2018: From December 27, 2017, to January 8, 2018, the eastern U.S. saw extremely cold temperatures and spiking electric demand, which again illustrate how such weather impacts natural gas supply to electric generating units. Nuclear

⁹⁶ IHS ENERGY, THE VALUE OF US POWER SUPPLY DIVERSITY 7 (July 2014), *available at* <https://www.nei.org/CorporateSite/media/filefolder/Backgrounders/Reports-Studies/IHS-Fuel-Diversity-Study-18-July-2014.pdf?ext=.pdf>.

⁹⁷ FirstEnergy Comments, Ex. 4 (“Hunger Aff.”) at 22, *Grid Resiliency Pricing Rule*, FERC Docket No. RM18-1-000 (Oct. 23, 2017).

⁹⁸ Staff Report at 118. NERC has also classified the changing resource mix as a “high risk” issue for the electric grid. See N. AM. ELEC. RELIABILITY CORP., STATE OF RELIABILITY 2017 7 (June 2017), *available at* https://www.nerc.com/pa/RAPA/PA/Performance%20Analysis%20DL/SOR_2017_MASTER_20170613.pdf.

⁹⁹ PJM INTERCONNECTION, ANALYSIS OF OPERATIONAL EVENTS AND MKT. IMPACTS DURING THE JAN. 2014 COLD WEATHER EVENTS 4 (May 8, 2014), <http://www.pjm.com/~media/library/reports-notice/weather-related/20140509-analysis-of-operational-events-and-market-impacts-during-the-jan-2014-cold-weather-events.ashx>.

¹⁰⁰ *Id.* at 26.

¹⁰¹ Secretary NOPR Letter at 3.

¹⁰² Staff Report at 95.

¹⁰³ Secretary NOPR Letter at 3.

and coal-fired plants out-performed natural gas plants during this period by a significant margin.¹⁰⁴ For example, on the morning of Friday, January 5, 2018, nuclear and coal-fired generators were running at 135% and 111% of their committed capacity in PJM's 2017-2018 capacity auction, whereas natural gas plants were running at merely 45% of their committed capacity.¹⁰⁵ In fact, while over 64,000 MW of gas-fired generation cleared in the 2017-2018 capacity auction, only approximately 29,000 MW were running that morning.¹⁰⁶ As the recent NETL Report on the cold weather event concluded, demand in PJM "could not have been met without coal."¹⁰⁷ These facts are quite telling, as much of this difference can be attributed to natural gas price spikes and supply interruptions.¹⁰⁸ While the PJM grid has not experienced load-shedding, thanks to lower electric demand over the holiday season and the performance of nuclear and coal-fired generators, this may not be the case during future extreme weather events if the trend of nuclear and coal-fired plant closures continues.¹⁰⁹

¹⁰⁴ See PJM COLD SNAP PERFORMANCE 2018 at 13 & fig.10 (showing that nuclear and coal-fired generation combined constituted 63% of the online fuel mix during the 2018 cold snap, while natural gas-fired generation constituted 22%).

¹⁰⁵ See *Data Miner 2*, PJM, <http://www.pjm.com/markets-and-operations/etools/data-miner-2.aspx> (when filtered to Generation by Fuel Type for 8 a.m. on January 5, 2018, showing nuclear and coal-fired output of 35,543 MW and 50,254.8 MW, respectively); *Commitments by Fuel Type & Delivery Year 2007/08 - 2019/20*, PJM, <http://www.pjm.com/-/media/markets-ops/rpm/rpm-auction-info/rpm-commitment-by-fuel-type-by-dy.ashx?la=en> (last visited Mar. 22, 2018) (showing cleared UCAP for 2017-2018 planning year of 26,401 MW for nuclear generation and 45,354 MW for coal-fired generation).

¹⁰⁶ See *Data Miner 2*, PJM, <http://www.pjm.com/markets-and-operations/etools/data-miner-2.aspx>, (when filtered to Generation by Fuel Type for 8 a.m. on January 5, 2018, showing gas output of 28,624.3 MW); *Commitments by Fuel Type & Delivery Year 2007/08 - 2019/20*, PJM, <http://www.pjm.com/-/media/markets-ops/rpm/rpm-auction-info/rpm-commitment-by-fuel-type-by-dy.ashx?la=en> (last visited Mar. 22, 2018) (showing cleared UCAP for 2017-2018 planning year of 64,089 MW for gas-fired generation); see also PJM COLD SNAP PERFORMANCE 2018 at fig.11.

¹⁰⁷ NETL Report at 17.

¹⁰⁸ Operational flow orders (restrictions/limitations placed on gas consumption by pipeline operators) have been in place on numerous natural gas pipelines throughout PJM since late December 2017, including Transco, Texas Eastern, Dominion, and Columbia. See Transco Pipeline, *Critical Notices*, <http://www.1line.williams.com/Transco/index.html> (last visited Mar. 22, 2018); Texas Eastern, *Critical Notices*, <https://infopost.spectraenergy.com/infopost/> (last visited Mar. 22, 2018); Dominion, *Critical Notices*, http://dekaflow.dominionenergy.com/jsp/info_post.jsp?&company=dti (last visited Mar. 22, 2018); Columbia Gas Transmission, *Critical Notices*, <http://www.columbiapipeinfo.com/cpginfopost/> (last visited Mar. 22, 2018). See also NETL Report at 14 ("[N]atural gas in PJM spiked from a normal level near \$3/MMBtu to \$96/MMBtu at the Texas Eastern M3 interface, in Southeastern PA, at the [bomb cyclone] peak on January 5.").

¹⁰⁹ NETL Report at 18 ("To maintain the resilience seen in this event, any retiring units that were dispatched during the event would have to be replaced with other resilient generation sources and their associated infrastructure (e.g. pipelines, transmission). Due to the timeframe required for permitting, development, and construction, these projects must be well underway prior to potential unit retirements to ensure their availability.").

June 2017 Yorktown Un-Retirement: The Department of Energy issued a Section 202(c) order to force Dominion Energy to keep its Yorktown coal-fired units in PJM online to address future reliability needs.¹¹⁰

System Design Changes: The bulk power system is undergoing a rapid transformation and the impacts of this change are not being fully studied or understood. The system is moving from one that was driven by sound engineering practices and multiple redundancies to a system using an economic model with no consideration for system needs. The North American Electric Reliability Corporation (“NERC”) has noted that the “changing resource mix is altering the operating characteristics of the bulk power system.”¹¹¹ NERC warned that these changes must be “properly managed in order to assure continued reliability and ensure resiliency.”¹¹²

Pipeline Vulnerabilities: A report published by Quanta Technology noted high levels of vulnerability in PJM from a shortfall of pipeline capacity supplying the Atlantic coast, a shortfall of pipeline capacity to access storage and production, disruptions in supply or storage during winter peak season, and a lack of firm gas supply contracts.¹¹³

Future Price Volatility: A recent report by IHS Energy states that the current diversified portfolio of the U.S. power supply lowers the cost of generating electricity by more than \$93 billion per year compared to a less diverse case with no meaningful contributions from nuclear and coal-fired generation.¹¹⁴ As such key baseload plants continue to retire, price volatility is expected to rise as the system becomes more reliant on a single fuel source.¹¹⁵ Dr. Hunger similarly concluded that, “[w]hen resources retire, [market] prices can fluctuate in an unpredictable manner.”¹¹⁶

Baseload Plant Closures: In the past four years, over 11,000 MW of coal-fired generation has closed in PJM, the equivalent of a dozen large power plants.¹¹⁷ Many of these plants were

¹¹⁰ Order No. 202-17-2 (Dep’t of Energy June 16, 2017), *reh’g dismissed sub nom.* Order No. 202-17-5 (Sep. 15, 2017). *See also* Order No. 202-17-4 (Dep’t of Energy Sep. 14, 2017) (renewing initial order), *reh’g dismissed sub nom.* Order No. 202-18-1 (Nov. 6, 2017); Order No. 202-18-2 (Dep’t of Energy Dec. 13, 2017) (further renewing order).

¹¹¹ Letter from Gerry Cauley, President and CEO, NERC, to Rick Perry, U.S. Sec’y of Energy, Attachment (“Synopsis of NERC Reliability Assessments”) at 1 (May 9, 2017), *available at* <https://www.nerc.com/news/Headlines%20DL/DOE%20Grid%20Study%20Comments%2012OCT17.pdf>.

¹¹² *Id.*

¹¹³ HENRY CHAO, COMMENTS OF QUANTA TECHNOLOGY ON PJM’S EVOLVING RESOURCE MIX AND SYSTEM RELIABILITY 11 (May 17, 2017), *available at* http://quanta-technology.com/sites/default/files/QuantaTechnology_Comments_on_PJM%20Whitepaper.pdf.

¹¹⁴ IHS ENERGY, THE VALUE OF US POWER SUPPLY DIVERSITY at 5.

¹¹⁵ *See id.* at 9-10.

¹¹⁶ Hunger Aff. at 33.

¹¹⁷ 2017 PJM Report at 544 tbl.12-5 (listing coal unit retirements of 2,239 MW, 7,064.8 MW, 243 MW, and 2,038 MW in 2014, 2015, 2016, and 2017, respectively).

operating during the 2014 Polar Vortex and are no longer available to run in the event of system stress.

Problems Associated with Location of Replacement Resources: Generation resources used to replace retiring plants are frequently located far away from the location of the retiring generation, which poses multiple problems. First, as Dr. Hunger states, this “may cause temporary or persistent congestion, increasing uncertainty related to locational pricing, a primary signal against which generation investment or retirement decisions need to be made.”¹¹⁸ Second, significant new transmission infrastructure may need to be constructed. For example, approximately \$1 billion of new transmission infrastructure was needed to maintain reliability after closure of certain generating units in northern Ohio in 2014 and 2015.¹¹⁹

Additional Plant Closures: Numerous baseload plants in PJM have announced that they are financially challenged and are closing or contemplating closure. If action is not taken, thousands of additional megawatts of reliable baseload power will retire in the next several years, leaving PJM without fuel-secure baseload resources.¹²⁰

- It is a matter of public record that FirstEnergy Solutions, which through Applicants indirectly owns 12,300 MW of generation, likely will file for bankruptcy by the end of March 2018.¹²¹ Multiple plants are at risk for permanent closure as a result of this expected action.
 - FirstEnergy Solutions submitted notices to PJM on March 28, 2018, that it would deactivate its three nuclear plants, Davis-Besse (908 MW), Perry (1,268 MW), and Beaver Valley (1,872 MW), by 2021.

¹¹⁸ Hunger Aff. at 33.

¹¹⁹ Direct Testimony of Gavin Cunningham at 3, Application of Ohio Edison et al., Pub. Util. Comm’n of Ohio No. 14-1297-EL-SSO (Aug. 4, 2014).

¹²⁰ In addition to the closures listed, Dominion submitted deactivation requests in January 2018 for four coal-fired units with capacity totaling approximately 400 MW. PJM FUTURE DEACTIVATIONS (Dec. 29, 2017), <http://www.pjm.com/-/media/planning/gen-retire/pending-deactivation-requests.ashx?la=en> (“PJM FUTURE DEACTIVATIONS”). These units were placed in “cold reserve”—meaning they could be restarted if necessary—based on a number of factors including the cost of solar and wind generation and the abundance of natural gas. Sarah Rankin, *Dominion to Eliminate Nearly 400 Positions After Review of Power Generation Group*, RICHMOND TIMES-DISPATCH (Jan. 17, 2018), http://www.richmond.com/news/virginia/dominion-to-eliminate-nearly-positions-after-review-of-power-generation/article_60633a02-01d5-50a8-bcfc-f2ccf04b8fb5.html.

¹²¹ Gavin Bade, *FirstEnergy CEO Says Generation Subsidiary Headed for Bankruptcy Protection*, UTILITY DIVE (Feb. 23, 2018), <https://www.utilitydive.com/news/firstenergy-ceo-says-generation-subsidiary-headed-for-bankruptcy-protection/517743/>; Jeffrey Ryser, *FirstEnergy continues Push Away from Competitive Generation Subsidiary*, PLATTS MEGAWATT DAILY (Feb. 22, 2018).

- FirstEnergy Corp. announced that Units 5–7 at the W.H. Sammis coal-fired plant (1,490 MW) are in danger of being closed. The company previously announced that Units 1–4 (720 MW) will close by May 2020.¹²²
- FirstEnergy Corp. has announced that the 2,510 MW Bruce Mansfield coal-fired plant is at risk of closure due to the exposure to changing market conditions.¹²³
- Allegheny Energy Supply Company, LLC, a FirstEnergy Corp. subsidiary, recently submitted a deactivation notice for Pleasants Power Station, a 1,300 MW coal-fired plant in West Virginia.¹²⁴
- Dayton Power & Light has announced the closure by June 2018 of the J.M. Stuart coal-fired plant (2,318 MW) and the Killen Station Unit 2 coal-fired plant (600 MW), citing market conditions making the plants not economically viable.¹²⁵ Stuart Unit 1 was closed even earlier, on September 30, 2017.¹²⁶
- Owners of the 1,884 MW Homer City coal-fired power plant attempted to sell the plant in 2016, but were unable to find a buyer; Standard & Poor's analysts cite lower power prices and increasing expenses as driving forces behind the facility's ills.¹²⁷
- Westmoreland Partners recently announced the sale or closure of the 209 MW Roanoke Valley coal-fired power plant.¹²⁸ As anticipated, on March 1, 2017, these units retired.¹²⁹

¹²² *FirstEnergy to Deactivate Units at Two Ohio Power Plants*, FIRSTENERGY (July 22, 2016), https://www.firstenergycorp.com/content/fecorp/newsroom/news_articles/firstenergy-to-deactivate-units-at-two-ohio-power-plants-.html; PJM FUTURE DEACTIVATIONS.

¹²³ Tom Henry, *FirstEnergy Exec Calls for 'Urgent' Aid*, TOLEDO BLADE (Mar. 25, 2017), <http://www.toledoblade.com/Energy/2017/03/25/FirstEnergy-exec-calls-for-urgent-aid.html>.

¹²⁴ *Id.* In addition, during the first quarter of 2018, FirstEnergy Corp. took a \$120 million pre-tax impairment charge on the value of the Pleasants Power Station. FirstEnergy Corp., Annual Report (Form 10-K) at 4 (Feb. 20, 2018).

¹²⁵ See Wendy Mitchell, *DP&L Determined to Close J.M. Stuart and Killen Power Plants*, THE LEDGER INDEP. (Mar. 20, 2017), http://www.maysville-online.com/news/local/dp-l-determined-to-close-j-m-stuart-and-killen/article_99f244ef-b832-5477-aa8b-831b8fe796be.html; PJM, FUTURE DEACTIVATIONS.

¹²⁶ *PJM Generator Deactivations*, PJM (Dec. 18, 2017), <http://www.pjm.com/-/media/planning/gen-retire/generator-deactivations.ashx?la=en> ("PJM DEACTIVATIONS").

¹²⁷ Anya Litvak, *Homer City Gets Bids But No Deals*, PITTSBURGH POST-GAZETTE (Sept. 14, 2016), <http://powersource.post-gazette.com/powersource/companies/2016/09/14/Homer-City-gets-some-bids-but-no-deals/stories/201609110096>.

¹²⁸ John Dixon, *Weldon Power Plant Closing*, THE DAILY HERALD (Roanoke) (Mar. 10, 2017), http://www.rdailyherald.com/news/local/weldon-power-plant-closing/article_6a9f1208-0511-11e7-a204-b762cd148f4a.html.

¹²⁹ PJM DEACTIVATIONS.

- Exelon has announced that it will close the Oyster Creek nuclear plant (608 MW) in October 2018—a decade before the end of its operating license—citing negative economic factors.¹³⁰
- Exelon has announced the premature closure of the 837 MW Three Mile Island nuclear power plant in September 2019, citing deteriorating economic value.¹³¹

C. The Emergency in Nuclear and Coal-Fired Generation Threatens Generation Diversity, Resiliency, Dependability, and Electric Security in PJM

A recent PJM report noted that the system was able to maintain operational reliability with a system comprised of 86 percent natural gas-fired generation, however the report did not fully capture risks associated with gas deliverability.¹³² PJM itself admits to this issue, stating, “We found that the risk to the system wasn’t that resources couldn’t necessarily provide reliability attributes but that the potential concentration of a single fuel source or low-probability, high-impact events could cause significant impacts to the system.”¹³³

Without baseload nuclear and coal-fired generation, the United States is taking the most sophisticated and redundant bulk electric system in the world and putting it on top of an unsophisticated bulk gas system that lacks the same level of redundancy, creating additional security risks. An electric system that is not resilient to high-impact events is not a reliable system, and is one that threatens the national security of the United States. In short, the continued retirement of nuclear and coal-fired generating facilities in PJM has resulted in an emergency situation that has placed the continuing security of PJM at risk. As you noted in your September 28, 2017 letter to FERC, “the resiliency of the electric grid is threatened by the premature retirement of these fuel-secure traditional baseload resources.”¹³⁴

¹³⁰ See Press Release, Exelon, Exelon to Retire Oyster Creek Generating Station in 2019 (Dec. 8, 2010), http://www.exeloncorp.com/newsroom/Pages/pr_20101208_Nuclear_OysterCreekRetirement.aspx; Robert Walton, *Exelon to Close Oyster Creek Nuke in October, a Year Early*, UTILITY DIVE (Feb. 2, 2018), <https://www.utilitydive.com/news/exelon-to-close-oyster-creek-nuke-in-october-a-year-early/516236/>; PJM FUTURE DEACTIVATIONS.

¹³¹ See Press Release, Exelon, Exelon to Retire Three Mile Island Generating Station in 2019 (May 30, 2017), <http://www.exeloncorp.com/newsroom/exelon-to-retire-three-mile-island-generating-station-in-2019>; PJM FUTURE DEACTIVATIONS.

¹³² PJM INTERCONNECTION, PJM’S EVOLVING RESOURCE MIX AND SYSTEM RELIABILITY 5 (Mar. 30, 2017) (“[A]dditional risks, such as gas deliverability during polar vortex-type conditions and uncertainties associated with economics and public policy, were not fully captured in this analysis.”), <http://www.pjm.com/~media/library/reports-notice/special-reports/20170330-pjms-evolving-resource-mix-and-system-reliability.ashx>.

¹³³ Press Release, PJM, PJM Study: System Reliable Even with Much More Gas, Renewables; Resilience Key to Operational Reliability (Mar. 30, 2017) (emphasis added) (quoting Michael Bryson, PJM Vice President of Operations), <http://www.pjm.com/~media/about-pjm/newsroom/2017-releases/20170330-pjms-evolving-resource-mix-and-system-reliability.ashx>.

¹³⁴ Secretary NOPR Letter at 1.

PJM itself has recognized the need for resiliency, finding that, “[i]n addition to delivering energy services reliably during strained system conditions, to which probabilities can be attached (e.g., plant outages, weather variability), a resilient energy system also must be resistant to larger scale shocks to which it is difficult to attach probabilities”¹³⁵ PJM recently concluded that “reliability attributes supplied through generation and other resources . . . support reliability” and “the maintenance or assurance of these attributes into the future are important to resilience mitigation.”¹³⁶ Fuel diversity and security are key components of a resilient grid. PJM acknowledged the connection between diversity and resiliency when it committed to “analyz[ing] future trends in resource mix and their impacts on both reliability and resilience.”¹³⁷ As PJM’s market monitor stated, “[s]ignificant reliance on specific fuels, including nuclear, coal and gas means that markets are at risk from a significant disruption in any one fuel.”¹³⁸

NERC goes further, recognizing not only the importance of fuel diversity in maintaining a resilient energy system,¹³⁹ but also the critical contributions of nuclear and coal-fired resources to mitigating risks to the electric grid.¹⁴⁰ Overreliance on natural gas, by contrast, *increases* risk to the electric grid because, as NERC states, “within a relatively short time, a major failure” in the natural gas transmission system “could result in a loss of electric generating capacity that could exceed the electric reserves available to compensate for these losses.”¹⁴¹ As explained by Dr. Henry Chao, Executive Advisor and Vice President at Quanta Technology and former Vice President at New York Independent System Operator (“NYISO”): “Abundant supplies of natural gas provide many advantages to electric consumers, but . . . natural gas delivery systems lack the reliability and redundancy of the bulk electric system. Specifically, there are no systematic reliability criteria for natural gas delivery system planning and operations; whereas the electric power industry has mandatory reliability standards that are developed and enforced by NERC.”¹⁴²

¹³⁵ PJM INTERCONNECTION, PJM’S EVOLVING RESOURCE MIX AND SYSTEM RELIABILITY 33 (Mar. 30, 2017).

¹³⁶ PJM Comments at 46.

¹³⁷ *Id.*

¹³⁸ 2017 PJM Report at 5.

¹³⁹ N. AM. ELEC. RELIABILITY CORP., SYNOPSIS OF NERC RELIABILITY ASSESSMENTS: THE CHANGING RES. MIX AND THE IMPACTS OF CONVENTIONAL GENERATION RETIREMENTS 4 (May 9, 2017) (“Fuel diversity provides a fundamental benefit of increased resilience. . . . Areas with limited fuel and/or limited resource diversity may be challenged and should increase their attention to resiliency planning . . .”).

¹⁴⁰ *Id.* (“Coal and nuclear resources, by design, are designed for low cost O&M and continuous operation. However, it is not the economics nor the fuel type that make these resources attractive from a reliability perspective. Rather, these conventional steam-driven generation resources have low forced and maintenance outage hours traditionally and have low exposure to fuel supply chain issues.”); *id.* at 2 (“Coal-fired and nuclear generation have the added benefits of high availability rates, low forced outages, and secured on-site fuel. Many months of on-site fuel allow these units to operate in a manner independent of supply chain disruptions.”).

¹⁴¹ N. AM. ELEC. RELIABILITY CORP., 2013 SPECIAL RELIABILITY ASSESSMENT: ACCOMMODATING AN INCREASED DEPENDENCE ON NATURAL GAS FOR ELECTRIC POWER; PHASE II: A VULNERABILITY AND SCENARIO ASSESSMENT FOR THE NORTH AMERICAN BULK POWER SYSTEM 3-4 (MAY 2013).

¹⁴² FirstEnergy Comments, Ex. 6 (“Chao Aff.”) at 11, *Grid Resiliency Pricing Rule*, FERC Docket No. RM18-1-000 (Oct. 23, 2017).

Unless immediate action is taken, the continued retirement of nuclear and coal-fired generating units—by breeding greater dependence on generation fueled by natural gas, which is subject to supply disruptions, constrained pipeline capacity, a general inability to store fuel on-site, and competing demand from consumer heating in winter months—will increasingly result in significant, negative outcomes for the approximately 65 million people living and working within the PJM footprint. These harmful consequences include increased electric price volatility, lessened grid resilience and dependability, uncertain electric security in the future, decreased economic stability, and severe job losses—especially in the coal sector—as both power plants and fuel suppliers declare bankruptcy and cease operations. Combined, these conditions are potentially disastrous for the electric grid and the economy. PJM itself recently found that as the “resource mix moves in the direction of less coal and nuclear generation, generator reliability attributes of frequency response, reactive capability and fuel assurance decrease. . . .”¹⁴³

This is not idle speculation. As illustrated over the period of extreme cold in the eastern U.S. from December 27, 2017, through January 8, 2018, PJM was able to maintain reliability on its system in large part due to the strong performance from nuclear and coal-fired generators—performance that well exceeded those plants’ commitments in PJM’s capacity auction. In contrast, natural gas-fired plants were operating well below expected levels. Without these fuel-secure baseload generating resources, many of which are facing imminent retirement, the outcome may have been much different. And with temperatures well below freezing throughout virtually all of PJM during this time, a different outcome could have been catastrophic to public health and safety.

The challenges are not limited to just PJM, but are rampant in competitive electric markets throughout the Nation. While traditional vertically integrated utilities continue to provide safe, reliable, and affordable electric generation service every day, areas with RTO markets face problems resulting from the failure to recognize the importance of fuel security and fuel diversity. These incidents provide insight into vulnerabilities potentially facing PJM:

February 26, 2008 Wind Decrease in ERCOT: An unexpected drop in wind generation coupled with a demand increase from cold weather caused ERCOT to have to cut service to large industrial customers.¹⁴⁴ ERCOT had 10 minutes to curtail nearly three percent of the system load to avoid blackouts.¹⁴⁵

¹⁴³ PJM INTERCONNECTION, PJM’S EVOLVING RES. MIX AND SYSTEM RELIABILITY 5 (Mar. 30, 2017).

¹⁴⁴ Eileen O’Grady, *Loss of Wind Causes Texas Power Grid Emergency*, REUTERS (Feb. 27, 2008), <http://www.reuters.com/article/us-utilities-ercot-wind-idUSN2749522920080228?feedType=RSS&feedName=domesticNews&rpc=22&sp=true>; E. ELA & B. KIRBY, NAT’L RENEWABLE ENERGY LAB., ERCOT EVENT ON FEBRUARY 26, 2008: LESSONS LEARNED (July 2008), <http://www.nrel.gov/docs/fy08osti/43373.pdf>.

¹⁴⁵ See Eileen O’Grady, *Loss of Wind Causes Texas Power Grid Emergency*, REUTERS (Feb. 27, 2008), <http://www.reuters.com/article/us-utilities-ercot-wind-idUSN2749522920080228?feedType=RSS&feedName=domesticNews&rpc=22&sp=true>.

February 2011 Cold Weather in ERCOT: Rolling blackouts affected 3.2 million customers and, had ERCOT not shed load, a widespread, uncontrolled blackout would have occurred.¹⁴⁶

New England ISO Winter Reliability Program: Since 2014, the New England Independent System Operator Inc. (“ISO New England”) has had to establish winter reliability programs in an attempt to ensure continued operation of natural gas-fired generators during periods of cold weather.¹⁴⁷ Pipeline capacity issues, first identified in 2004, remain issues today and have yet to be solved by the competitive marketplace.¹⁴⁸ As ISO New England recently noted, “[i]n New England, the most significant resilience challenge is fuel security—or the assurance that power plants will have or be able to obtain the fuel they need to run, particularly in winter—especially against the backdrop of coal, oil, and nuclear unit retirements, constrained fuel infrastructure, and the difficulty in permitting and operating dual-fuel generating capability.”¹⁴⁹ ISO New England thus concluded that “while New England is meeting its resource adequacy requirements for capacity—which are based on expected summer peak demands—with the market mechanisms that are in place today, from an energy availability standpoint, the shift from generators with on-site fuel to generators relying on ‘just-in-time’ fuel delivery is challenging the system’s adequacy and, therefore, its resilience, particularly during winter peak demands.”¹⁵⁰ Indeed, in nearly all of the fuel mix scenarios studied by ISO New England, there would be “[e]nergy shortfalls due to inadequate fuel . . . requiring frequent use of emergency actions to keep power flowing and protect the grid.”¹⁵¹ These emergency actions could include rolling blackouts.¹⁵²

2016-2017 Aliso Canyon in CAISO: A leak at the Aliso Canyon natural gas storage facility was discovered in October 2015, causing the facility to close to subsequent injections until July 2017.¹⁵³ Although Aliso Canyon continues to operate, the California Public Utilities Commission

¹⁴⁶ FEDERAL ENERGY REGULATORY COMM’N & N. AM. ELEC. RELIABILITY CORP., REPORT ON OUTAGES AND CURTAILMENTS DURING THE SOUTHWEST COLD WEATHER EVENT OF FEBRUARY 1-5, 2011 1 (2011).

¹⁴⁷ Press Release, ISO New England, Winter 2015/2016: Sufficient Power Supplies Expected to Be Available (Dec. 1, 2015), *available at* https://www.iso-ne.com/static-assets/documents/2015/12/20151201_winter_outlook_release_final.pdf.

¹⁴⁸ Peter Brandien, Vice President, Operations, ISO New England, Panel Discussion Remarks at 1, *Winter 2016-2017 Operations and Market Performance in Regional Transmission Orgs. and Indep. Sys. Ops.*, FERC Docket No. AD16-24-000 (Oct. 20, 2016).

¹⁴⁹ ISO New England, Response of ISO New England at 1, *Grid Resilience in Regional Transmission Organizations and Independent System Operators*, FERC Docket No. AD18-7-000 (Mar. 9, 2018).

¹⁵⁰ *Id.* at 8.

¹⁵¹ *Id.*, Attachment A at 4-5.

¹⁵² *Id.* In contrast to PJM, which is looking to FERC for guidance and direction, ISO New England is taking initiative and studying fuel security issues. *Id.* at 26.

¹⁵³ Rob Nikolewski, *Utility Resumes Injections at Aliso Canyon, Site of Massive Gas Leak*, SAN DIEGO UNION-TRIBUNE (Aug. 1, 2017), <http://www.sandiegouniontribune.com/business/sd-fi-aliso-reinjections-20170801-story.html>.

has opened a proceeding “to determine the feasibility of minimizing or eliminating the use of [the facility]”¹⁵⁴ and legislation was introduced to shut down the facility.¹⁵⁵

May 3, 2017 CAISO Emergency: Normal system operations quickly turned into an emergency when energy imports failed to materialize.¹⁵⁶ The impacts were heightened as the daily rapid decline of solar power occurred as evening approached.¹⁵⁷ The California Independent System Operator Inc. (“CAISO”) had minutes to deploy emergency reserves and quickly went from normal system operations to a Stage 1 Emergency.¹⁵⁸

Natural Gas Plant Bankruptcies: In 2016, two large natural gas-fired plants in California, totaling 1,778 MW, declared bankruptcy because they could not make sufficient revenues in the CAISO wholesale markets.¹⁵⁹ In 2017, Panda Temple Power’s 758 MW natural gas plant in Texas filed for bankruptcy.¹⁶⁰ GenOn Energy, with over 9,000 MW of gas-fired generation, filed for bankruptcy in 2017 as well,¹⁶¹ and recently announced the retirement of three gas-fired power plants located in Southern California due to “economic reasons.”¹⁶²

D. Emergency Action by the Secretary Is Required

Although FERC complied with the directive of the Secretary pursuant to Section 403 of the DOE Organization Act in issuing a Notice of Proposed Rulemaking addressing these issues,¹⁶³ it has failed to undertake any action that will stem the tide of plant closures and thus prevent the impending crisis. You yourself said that “it is [FERC’s] immediate responsibility to take action

¹⁵⁴ CAL. PUB. UTILS. COMM’N, *Aliso Canyon Well Failure Order Instituting Investigation*, <http://www.cpuc.ca.gov/AlisoOII/> (last visited Mar. 22, 2018).

¹⁵⁵ Chris Megerian, *Proposal Would Close Aliso Canyon—But Not for A Decade*, L.A. TIMES (Sept. 14, 2017), <http://www.latimes.com/politics/essential/la-pol-ca-essential-politics-updates-aliso-canyon-leak-1505427333-htmlstory.html>.

¹⁵⁶ Jason Fordney, *California Grid Emergency Comes Days After Reliability Warning*, RTO INSIDER (May 8, 2017).

¹⁵⁷ *Id.*

¹⁵⁸ *Id.*

¹⁵⁹ Herman K. Trabish, *As Gas Plants Struggle, California Seeks New Flexible Capacity Strategies*, UTILITY DIVE (June 27, 2017), <http://www.utilitydive.com/news/as-gas-plants-struggle-california-seeks-new-flexible-capacity-strategies/445760/>.

¹⁶⁰ *Id.*; Cody Weems, *Panda Temple I Plant Files for Chapter 11 Bankruptcy*, TEMPLE DAILY TELEGRAM (May 11, 2017), http://www.tdtnews.com/news/article_efa76536-36a3-11e7-8b73-034537689093.html.

¹⁶¹ Herman K. Trabish, *As Gas Plants Struggle, California Seeks New Flexible Capacity Strategies*, UTILITY DIVE (June 27, 2017), <http://www.utilitydive.com/news/as-gas-plants-struggle-california-seeks-new-flexible-capacity-strategies/445760/>; see also Andrew Scurria & Patrick Fitzgerald, *GenOn Energy Files for Chapter 11 Bankruptcy Protection*, WALL ST. J. (June 14, 2017), <https://www.wsj.com/articles/genon-energy-files-for-chapter-11-bankruptcy-protection-1497445051>.

¹⁶² Samantha Masunaga, *NRG Subsidiary to Close Three Power Plants in Southern California*, L.A. TIMES (Mar. 9, 2018), <http://www.latimes.com/business/la-fi-nrg-plants-20180309-story.html>.

¹⁶³ Grid Resiliency Pricing Rule, 82 Fed. Reg. 46,940 (Oct. 10, 2017).

to ensure that generation resources with on-site fuel supplies and the ability to provide essential energy and ancillary reliability services including voltage support, frequency services, operating reserves, and reactive power are fully valued. . . .¹⁶⁴ But FERC failed to do so and there is no indication that meaningful and substantive action by FERC will come in time to stem the tide of plant closures.

The DOE correctly recognized that the “recent Polar Vortex, as well as the devastation from Superstorm Sandy and Hurricanes Harvey, Irma, and Maria, reinforces the urgency that [FERC] must act now.”¹⁶⁵ Further, as you observed, “over the past several years, [FERC] has developed an extensive record on price formation [issues] in [FERC] approved ISOs and RTOs.”¹⁶⁶ And, as you recently noted, “[t]he voluminous comments filed in the [FERC NOPR] proceeding provide substantial evidence of, and otherwise confirm, the threat to the nation’s electricity grid and the urgent need for [FERC] action to reform market rules to preserve fuel-secure generation resources.”¹⁶⁷ Despite the urgency and its extensive record, FERC has failed to take the action necessary to address the emergency in PJM.

As you correctly noted, “it is especially urgent to prevent premature retirements of the resources that have these critical [fuel-secure] attributes.”¹⁶⁸ As a result of FERC’s and the RTOs’ failure to address this crisis, swift and decisive action is needed *now* to address this imminent loss of nuclear and coal-fired baseload generation and the threat to the electric grid that this loss poses. The Secretary needs to immediately issue an emergency order, pursuant to his authority under section 202(c) of the Federal Power Act, 16 U.S.C. § 824a(c), to ensure that baseload nuclear and coal-fired generators in PJM do not retire prematurely and are fully compensated for the benefits and services that they provide, as more fully described in Section II.B above. The order should find that an emergency exists because of the recent and imminent critical reduction in nuclear and coal-fired generation capacity, which threatens generation diversity, resiliency, dependability, and electric security in PJM. As this winter’s events revealed, without the availability of these critical, fuel-secure plants during extreme weather events (which can happen at any time during the year—not just in the winter), the PJM grid will likely experience reliability issues.

E. Information Required by Section 205.373

Applicants provide below the information called for by Section 205.373 of DOE’s regulations.¹⁶⁹ To be clear, Applicants’ request in this application applies to *all* eligible plants in

¹⁶⁴ Secretary Extension Letter at 1.

¹⁶⁵ Dep’t of Energy, Notice of Proposed Rulemaking to FERC at 11 (Sept. 28, 2017).

¹⁶⁶ Secretary NOPR Letter at 6.

¹⁶⁷ Secretary Extension Letter at 1.

¹⁶⁸ Secretary NOPR Letter at 1.

¹⁶⁹ 10 C.F.R. § 205.373. Certain elements of Section 205.373 address the circumstances of an applicant facing a shortage of real power and the prospect of firm customer curtailment, but do not address the emergency circumstances described herein, which involve a threat to the system more broadly. Applicants have indicated where these requirements are not applicable to the circumstances at hand.

PJM, not just those that they themselves own and operate. However, at this time Applicants only possess the required information for their own plants. To address this fact, Applicants request that the Secretary require PJM to obtain such information immediately from all eligible generators and begin negotiating agreements for the continued operation and appropriate compensation of such units.

- a) Legal name of applicants. The applicants are FirstEnergy Generation, LLC, FirstEnergy Nuclear Generation, LLC, FirstEnergy Nuclear Operating Company, and FirstEnergy Generation Mansfield Unit 1 Corp. This application refers to these entities, collectively, as "Applicants."

- b) Person to whom correspondence should be addressed. Correspondence with respect to this application should be directed to the following persons:

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- c) Political subdivisions in which applicants operate and conduct business. Applicants own and operate certain nuclear and coal-fired generation assets, and provide energy-related products and services to retail and wholesale customers, in the states of Ohio and Pennsylvania.

- d) Baseline data.

- 1) Daily peak load and energy requirements for each of the past 30 days, and projections for each day of the Emergency Period. These requirements are not applicable to Applicants' request, which contemplates relief on a broad scale. Nonetheless, Applicants provide as Attachment B a chart showing the monthly output of nuclear and coal-fired generation in PJM for the period 2012 through 2017.
- 2) All capacity and energy receipts or deliveries to other electric utilities for each of the past 30 days. Applicants respectfully submit that such information is not applicable to the present application.
- 3) The status of all interruptible customers for each of the past 30 days, and anticipated status during the Emergency Period. Applicants respectfully submit that such information is not applicable to the present application. Applicants are requesting emergency relief to *avoid* the interruption of power supply to the 65 million customers in the PJM footprint.

- 4) All scheduled capacity and energy receipts or deliveries to other electric utilities during the Emergency Period. Applicants respectfully submit that such information is not applicable to the present application.
- e) A description of the emergency situation, any contingency plan, and the current level of implementation. The emergency situation faced by PJM and consumers of electric energy within its footprint is described above in Section I and Section II.B. Applicants do not have any contingency plan to provide power to the PJM market and its 65 million customers absent an order of the Secretary in accordance with the emergency relief requested herein. As explained above, nuclear and coal-fired generating units in PJM are closing at an alarming rate, with efforts to “save” generation for energy security having failed. Implementation prior to the Secretary granting emergency relief is unworkable.
- f) A showing that adequate electric service to firm customers cannot be maintained without additional power transfers. As explained above, the recent and imminent shut-down of nuclear and coal-fired generating units in PJM puts at risk the ability to provide firm, reliable electric service within the PJM footprint without emergency action to maintain the operation of these generating facilities.
- g) A description of any conservation or load reduction actions that have been implemented. PJM has implemented limited demand response efforts in recent years,¹⁷⁰ but these efforts, and future similar ones, cannot come close to replacing the nuclear and coal-fired generation at risk of loss.
- h) A description of efforts made to obtain additional power through voluntary means and the results of such efforts. Applicants respectfully submit that such information is not applicable to the present application because it is the responsibility of PJM, not Applicants, to balance load and resources within the PJM footprint. PJM’s efforts to obtain additional power through voluntary means has been limited to market redesign efforts, such as Capacity Performance, which have failed to add sufficient fuel-secure generating capacity to the PJM market. Additionally, PJM is “fuel neutral” and has undertaken no effort to maintain nuclear and coal-fired generation, which provides fuel diversity and helps ensure sufficiency of supply during times of spiking demand such as that experienced this past winter.
- i) A listing of proposed sources and any amounts of power necessary from each source to alleviate the emergency and a listing of any other “entities” that may be directly affected by the requested order. See Attachment A for listing of nuclear and coal-fired generation facilities in PJM. Applicants submit that firm power supply agreements between PJM and the owners of each nuclear and coal-fired generating facility in PJM satisfying the criteria set forth in Section II.F are necessary to alleviate the emergency. Such generating facilities provide significant

¹⁷⁰ See *PJM Markets FAQ*, PJM, <https://learn.pjm.com/three-priorities/buying-and-selling-energy/markets-faqs.aspx> (last visited Mar. 22, 2018).

benefits to energy markets and the public at large, including fuel security and diversity, but receive no reliable cost support and, instead, must rely on PJM's power markets which fail to compensate these generators for the full value of the benefits that they provide.¹⁷¹

- j) Specific proposals to compensate the supplying "entities" for the emergency services requested and to compensate any transmitting "entities" for services necessary to deliver such power. Applicants propose that, as long as an emergency continues to exist, subject generators and PJM shall operate pursuant to contracts developed and agreed upon by the parties themselves. As explained below, in the event that PJM and the generators are unable to agree to the contractual terms within fifteen (15) days of the issuance of the order, then Applicants request that the Secretary step in and determine the just and reasonable compensation and conditions.
- k) A showing that, to the best of the applicant's knowledge, the requested relief will not unreasonably impair the reliability of any "entity" directly affected by the requested order to render adequate service to its customers. The relief requested by Applicants is to *secure* the reliability of every entity and customer located within PJM's boundaries; no entities are expected to be reasonably or unreasonably impaired by the requested relief. Indeed, the requested relief is designed to enhance the ability of the subject generators and PJM to serve customers.
- l) Description of the facilities to be used to transfer the requested emergency service to the applicant's system. In order to retain the electric generation necessary to prevent and alleviate the emergency, the Secretary's order pursuant to Section 202(c) should apply to nuclear and coal-fired generators located within the PJM footprint that have a supply of fuel on-site sufficient to allow twenty-five (25) days of operation at full output, that are substantially compliant with all applicable federal, state, and local environmental laws and regulations, and that do not recover any of their capital or operating costs through rates regulated by a duly authorized state regulatory authority, municipal government, or energy cooperative. Such generating facilities provide significant benefits to energy markets and the public at large, including fuel security and diversity, but receive no reliable cost support and, instead, must rely on PJM's power markets which fail to compensate these generators for the full value of the benefits that they provide. Attachment A provides a listing of all nuclear and coal-fired generation facilities in PJM but only some of these facilities will likely satisfy the above criteria.
- m) A general or key map on a scale not greater than 100 kilometers to the centimeter showing, in separate colors, the territory serviced by each "entity" named in the application; the location of the facilities to be used for the generation and

¹⁷¹ Although PJM's markets fail to adequately compensate nuclear and coal-fired generators for the benefits that they provide, a subset of these generators may nevertheless recover their costs plus an acceptable rate of return through other regulatory mechanisms.

transmission of the requested emergency service; and all connection points between systems. Insofar as this application seeks action by the Secretary regarding all eligible plants in PJM, the type of map specifically requested is not relevant to this application. Nonetheless, Applicants attach as Attachment C a map of the PJM territory, and as Attachment D a map of Applicants' nuclear and coal-fired generating facilities. In addition, attached as Attachment E is a map issued by the PJM Market Monitor showing actual and planned retirements generating units from 2011 through 2020.

- n) An estimate of the construction costs of any proposed temporary facilities and a statement estimating the expected operation and maintenance costs on an annualized basis. Applicants respectfully submit that such information is not applicable to the present application. Due to the nature of Applicants' requested relief, there are no anticipated construction costs, and annualized operation and maintenance costs will remain roughly the same for subject facilities.

F. Requested Order

Applicants respectfully request that DOE issue an emergency order directing (i) the subject baseload nuclear and coal-fired generators to enter into contracts and all necessary arrangements with PJM, on a plant-by-plant basis, to generate, deliver, interchange, and transmit electric energy, capacity, and ancillary services to maintain fuel diversity and grid dependability and resiliency within the PJM region and (ii) PJM to pay such qualifying generating facilities just and reasonable cost-based rates that provide for full cost recovery consistent with ratemaking standards and principles or as otherwise necessary to ensure continued operations. In addition, the order should direct PJM to begin negotiating immediately with such generators on the terms of such supply.

Applicants respectfully request that each baseload generator eligible to participate—nuclear and coal-fired generators located within the PJM footprint that have a supply of fuel on-site sufficient to allow twenty-five (25) days of operation at full output, that are substantially compliant with all applicable federal, state, and local environmental laws and regulations, and that do not recover any of their capital or operating costs through rates regulated by a duly authorized state regulatory authority, municipal government, or energy cooperative—be compensated with just and reasonable rates that provide for full recovery of its fully allocated costs and a fair return on equity. The compensable costs used to establish this amount shall include, but are not necessarily limited to, operating expenses, costs of capital and debt, and a fair return on equity and investment. Just and reasonable rates shall provide for (a) full cost recovery consistent with ratemaking standards and principles or (b) full recovery of all costs necessary to ensure continued operations.¹⁷² If PJM and the owners are unable to agree to the contractual terms within fifteen

¹⁷² Certain nuclear and coal-fired units have, for financial reporting purposes, impaired the generating asset values based on the expectation that market revenues would not be sufficient to provide a return of and on invested capital. The fact that these assets were impaired for financial reporting purposes does not change the amount that was invested in the plant nor does it relieve their owners from their obligations to bondholders. As a result, the traditional cost-of-service model needs to be modified to allow cost recovery based on pre-impairment asset

(15) days of the issuance of the order, then Applicants request that the Secretary step in and determine the just and reasonable compensation and conditions.

Applicants request that payments begin on the effective date of each contract, and service under the contracts begin no later than sixteen (16) days after the issuance of the Order. If no agreement as to terms has been reached by this time, then the payment that the eligible generators receive for such service will be subject to true-up based on the just and reasonable rate that is ultimately prescribed.

Applicants request that the order become effective immediately and that, at a minimum, the order should remain in effect for four (4) years from the date of issuance or until the Secretary determines that the emergency has ceased to exist because the PJM markets have been fixed to properly compensate these units for the resiliency and reliability benefits that they provide, whichever is later.¹⁷³ Further, because the eligible nuclear and coal-fired generators must continue to substantially comply with all applicable federal, state, and local environmental laws and regulations, the provision in Section 202(c) limiting the duration to a 90-day period is not applicable.¹⁷⁴

values or it needs to be modified to allow a return on equity on the post-impairment asset value with an additional allowance for recovery of maturing debt in addition to interest expense.

¹⁷³ The Secretary has very broad authority to order “temporary connections of facilities and such generation, delivery, interchange, or transmission of electric energy as in [his] judgment will best meet the emergency and serve the public interest.” 16 U.S.C. § 824a(c)(1). As prior 202(c) orders reflect, “temporary” emergencies may vary greatly in length and may even be open ended. Indeed, in *Cross-Sound Cable*, the Secretary initially issued an order with a duration from August 14, 2003 until September 1, 2003, but later extended the order “until such time as the emergency identified in this order cease[d] to exist” Order No. 202-03-2 (Dep’t of Energy Aug. 28, 2003). In addition, the Secretary’s initial order to Mirant Corporation in 2005 lasted nearly 10 months. Order No. 202-05-3, *D.C. Pub. Serv. Comm’n*, Docket No. EO-05-01, at 10 (Dep’t of Energy Dec. 20, 2005).

¹⁷⁴ See 16 U.S.C. § 824a(c)(4)(A) (limiting the duration of a Section 202(c) order to 90 days if such order “may result in a conflict with a requirement of any Federal, State, or local environmental law or regulation”).

III. CONCLUSION

The time for talk is over. We find ourselves at a crisis point where significant baseload generation will cease to exist in RTO markets without quick and decisive intervention. Baseload generation does not have the luxury of time; the personal health and safety, economic development, jobs and livelihood of the communities where they are located, as well as our national security, hang in the balance.

It would also be a grave mistake to assume that there is no immediate emergency requiring immediate action now that winter is over. Premature nuclear and coal-fired plant closures know no season—as the announcement yesterday that FirstEnergy Solutions will deactivate over 4,000 MW of nuclear generation shows. The resilience and security of the electric grid can be jeopardized at any moment by any high-impact event—not just those that are weather driven. The health, safety, and welfare of the Nation, as well as our economic and physical well-being must be protected at all times from all potential threats to our electric grid.

As explained herein, Applicants respectfully request that the Secretary utilize the authority granted to DOE under Section 202(c) of the Federal Power Act and immediately issue the emergency order described above. Such quick and decisive intervention is necessary to avoid a crisis point where such baseload generation will cease to exist in RTO markets, and to ensure that nuclear and coal-fired generators operating within PJM are compensated fairly for their costs and the benefits that they provide such that they can continue to operate and ensure a dependable, affordable, safe, secure, and clean supply of electricity.

Respectfully submitted,

/s/ Rick C. Giannantonio

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Counsel for Applicants

cc: Bruce J. Walker, Assistant Secretary, DOE Office of Elec. Delivery & Energy Reliability
Patricia A. Hoffman, Principal Deputy Assistant Secretary, DOE Office of Elec. Delivery & Energy Reliability

Attachments

CERTIFICATE OF SERVICE

I hereby certify that, in accordance with 10 C.F.R. § 205.372, I have or will shortly cause copies of the foregoing documents to be served on the parties listed below by causing copies of the same to be sent via overnight delivery.

Federal Energy Regulatory Commission
Delaware Public Service Commission
Illinois Commerce Commission
Indiana Utility Regulatory Commission
Kentucky Public Service Commission
Maryland Public Service Commission
Michigan Public Service Commission
State of New Jersey Board of Public Utilities
North Carolina Utilities Commission
Public Utilities Commission of Ohio
Pennsylvania Public Utilities Commission
Tennessee Public Utility Commissions
Commonwealth of Virginia State Corporation Commission
Public Service Commission of West Virginia
New York Public Service Commission
Public Service Commission of the District of Columbia
PJM Interconnection
ReliabilityFirst Corp.
SERC Reliability Corporation
AES Warrior Run
Avon Lake
B L England
Beaver Valley
Birchwood Power
Braidwood Generation Station
Brandon Shores
Brunner Island
Byron Generating Station
Calvert Cliffs Nuclear Power Plant
Cardinal
Chalk Point
Chambers Cogeneration LP
Chesterfield
Cheswick Power Plant
Clover
Conemaugh
Conesville
Cooper
Covington Facility
CP Crane

Davis Besse
Dickerson
Donald C Cook
Dover
Dresden Generating Station
East Bend
Edgecombe Genco
FirstEnergy Bruce Mansfield
FirstEnergy Fort Martin Power Station
FirstEnergy Harrison Power Station
FirstEnergy Pleasants Power Station
FirstEnergy W H Sammis
General James M Gavin
H L Spurlock
Herbert A Wagner
Homer City Generating Station
Indian River Generating Station
Ingredion Incorporated
J M Stuart
James River Genco
John E Amos
Joliet 9
Joliet 29
Keystone
Killen Station
Kincaid
LaSalle Generating Station
Limerick
Logan Generating Company
Longview Power Plant
Luke Mill
Mecklenburg Power Station
Miami Fort
Mitchell (WV)
Morgantown Generating Plant
Mountaineer
Mt Storm
North Anna
Orrville
Oyster Creek
P H Glatfelter
P H Glatfelter Chillicothe Facility
Painesville
Peach Bottom
Perry
Powerton

PSEG Hope Creek Generating Station
PSEG Salem Generating Station
Quad Cities Generating Station
Radford Army Ammunition Plant
Rockport
Spruance Genco
Surry
TalenEnergy Montour
TalenEnergy Susquehanna
Tennessee Eastman Operations
Three Mile Island
University of Notre Dame
Virginia City Hybrid Energy Center
W H Zimmer
Waukegan
Wausau Paper Middletown
Whitewater Valley
Will County
Yorktown

/s/ Christopher Smith

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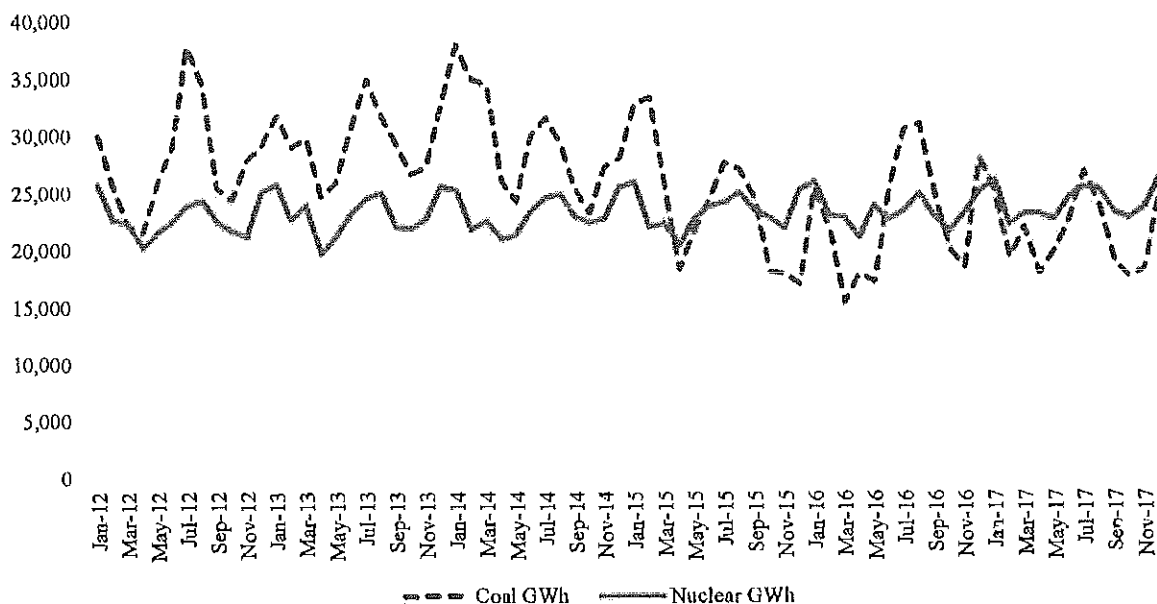
ATTACHMENT A
NUCLEAR AND COAL-FIRED GENERATING UNITS IN PJM
(NAMEPLATE CAPACITY)

Facility	Primary Owner (per EIA)	Coal (MW)	Nuclear (MW)
AES Warrior Run	AES WR Ltd Partnership	229	
Avon Lake	NRG Power Midwest LP	680	
Beaver Valley	FirstEnergy Nuclear Operating Co.		1846.8
Birchwood Power	Birchwood Power Partners LP	258.3	
Braidwood Generation Station	Exelon Nuclear		2449.8
Brandon Shores	Raven Power Holdings LLC	1370	
Brunner Island	Brunner Island LLC	1616.1	
Byron Generating Station	Exelon Nuclear		2449.8
Calvert Cliffs Nuclear Power Plant	Exelon Nuclear		1828.7
Cardinal	AEP Generation Resources Inc.	1880.4	
Chalk Point	NRG Chalk Point LLC	728	
Chambers Cogeneration LP	US Operating Services Company	285	
Chesterfield	Virginia Electric & Power Company	1352.9	
Cheswick Power Plant	NRG Power Midwest LP	637	
Clover	Virginia Electric & Power Company	848	
Conemaugh	GenOn Northeast Management Co.	1872	
Conesville	AEP Generation Resources Inc.	1729.3	
Cooper	East Kentucky Power Coop, Inc.	344	
Covington Facility	MeadWestvaco Corp.	44.5	
CP Crane	Raven Power Holdings LLC	399.8	
Davis Besse	FirstEnergy Nuclear Operating Co.		925.2
Dickerson	GenOn Mid-Atlantic LLC	588	
Donald C Cook	Indiana Michigan Power Company		2285.3
Dover	City of Dover, Ohio	27.5	
Dresden Generating Station	Exelon Nuclear		2018.6
East Bend	Duke Energy Kentucky Inc.	772	
Edgecombe Genco	Edgecombe Operating Services LLC	114.8	
FirstEnergy Bruce Mansfield	FirstEnergy Generation Corp.	2741.1	
FirstEnergy Fort Martin Power Station	Monongahela Power Company	1152	
FirstEnergy Harrison Power Station	Allegheny Energy Supply Co LLC	2052	
FirstEnergy Pleasants Power Station	Allegheny Energy Supply Co LLC	1368	
FirstEnergy W H Sammis	FirstEnergy Generation Corp.	2455.6	
General James M Gavin	AEP Generation Resources Inc.	2600	
H L Spurlock	East Kentucky Power Coop, Inc.	1608.5	
Herbert A Wagner	Raven Power Holdings LLC	495	

Facility	Primary Owner (per EIA)	Coal (MW)	Nuclear (MW)
Homer City Generating Station	NRG Homer City Services LLC	2012	
Indian River Generating Station	Indian River Operations Inc.	445.5	
Ingredion Incorporated	Ingredion Inc. - Illinois	45	
J M Stuart	Dayton Power & Light Company	1841.4	
James River Genco	Hopewell Operating Services LLC	114.8	
John E Amos	Appalachian Power Company	2932.6	
Joliet 9	Midwest Generations EME LLC	360.4	
Joliet 29	Midwest Generations EME LLC	1320	
Keystone	GenOn Northeast Management Co.	1872	
Killen Station	Dayton Power & Light Company	660.6	
Kincaid	Dynegy Kincaid Generation	1319	
LaSalle Generating Station	Exelon Nuclear		2340
Limerick	Exelon Nuclear		2277
Logan Generating Company	US Operating Services Company	242.3	
Longview Power Plant	Longview Power, LLC	807.5	
Luke Mill	NewPage Corp-Luke	65	
Mecklenburg Power Station	Virginia Electric & Power Company	139.8	
Miami Fort	Dynegy Miami Fort	1114.8	
Mitchell (WV)	Kentucky Power Company	1632.6	
Morgantown Generating Plant	GenOn Mid-Atlantic LLC	1252	
Mountaineer	Appalachian Power Company	1300	
Mt Storm	Virginia Electric & Power Company	1662.4	
North Anna	Virginia Electric & Power Company		1959.4
Orrville	City of Orrville, Ohio	84.5	
Oyster Creek	Exelon Nuclear		550
P H Glatfelter	P H Glatfelter Company	70.4	
P H Glatfelter Chillicothe Facility	P H Glatfelter Company	27.2	
Painesville	City of Painesville	53.5	
Peach Bottom	Exelon Nuclear		2621.8
Perry	FirstEnergy Nuclear Operating Co.		1311.6
Powerton	Midwest Generations EME LLC	1785.6	
PSEG Hope Creek Generating Station	PSEG Nuclear LLC		1290.7
PSEG Salem Generating Station	PSEG Nuclear LLC		2340
Quad Cities Generating Station	Exelon Nuclear		2018.6
Radford Army Ammunition Plant	U S Army-Radford	24	
Rockport	Indiana Michigan Power Company	2600	
Spruance Genco	Spruance Genco LLC	229.6	
Surry	Virginia Electric & Power Company		1695
TalenEnergy Montour	TalenEnergy Montour LLC	1775.1	
TalenEnergy Susquehanna	TalenEnergy Susquehanna LLC		2596

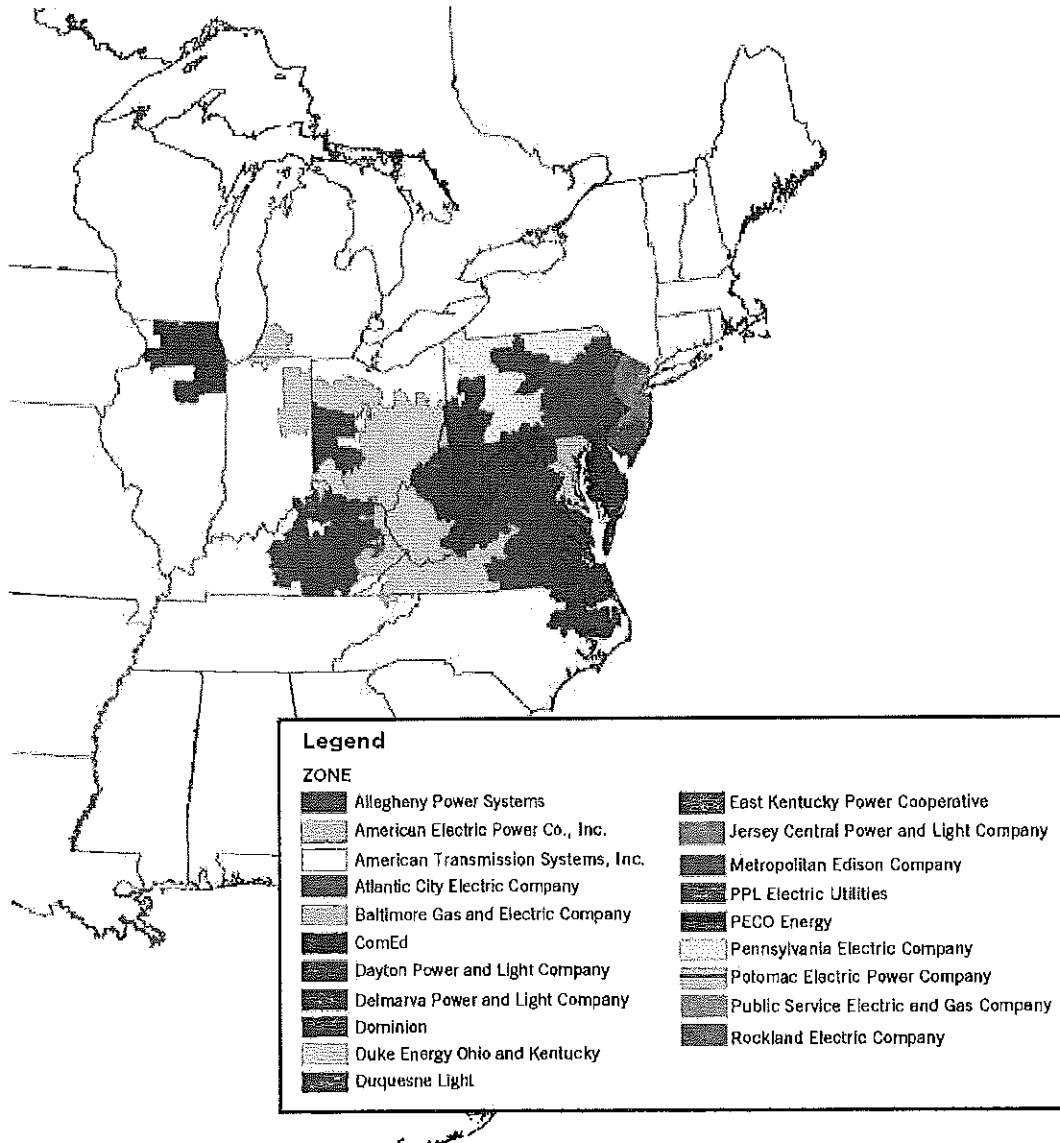
Facility	Primary Owner (per EIA)	Coal (MW)	Nuclear (MW)
Tennessee Eastman Operations	Eastman Chemical Company	194.3	
Three Mile Island	Exelon Nuclear		980.8
University of Notre Dame	University of Notre Dame	16.4	
Virginia City Hybrid Energy Center	Virginia Electric & Power Company	668	
W H Zimmer	Dynegy W H Zimmer	1425.6	
Waukegan	Midwest Generations EME LLC	681.7	
Wausau Paper Middletown	Wausau Paper Middletown	7.5	
Whitewater Valley	City of Richmond, Indiana	93.9	
Will County	Midwest Generations EME LLC	598.4	
Yorktown	Virginia Electric & Power Company	375	
Sources: 2016 Form EIA-860 Data (units with primary fuel of nuclear, or bituminous, refined, or subbituminous coal); PJM, FUTURE DEACTIVATIONS (Feb. 26, 2018), http://www.pjm.com/-/media/planning/gen-retire/pending-deactivation-requests.ashx?la=en .			

ATTACHMENT B
OUTPUT OF NUCLEAR AND COAL-FIRED GENERATORS IN PJM
INTERCONNECTION (GWH) (2012–2017)



Source: Monitoring Analytics LLC, STATE OF THE MARKET REPORTS FOR PJM (2012–2017),
http://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2017.shtml.

ATTACHMENT C
MAP OF PJM INTERCONNECTION TRANSMISSION ZONES



Source: PJM, <http://www.pjm.com/library/~media/about-pjm/pjm-zones.ashx>.

ATTACHMENT D
APPLICANTS' NUCLEAR AND COAL-FIRED GENERATING FACILITIES

Perry Nuclear Power Plant

Davis-Besse
Nuclear Power Station

Bruce Mansfield Plant

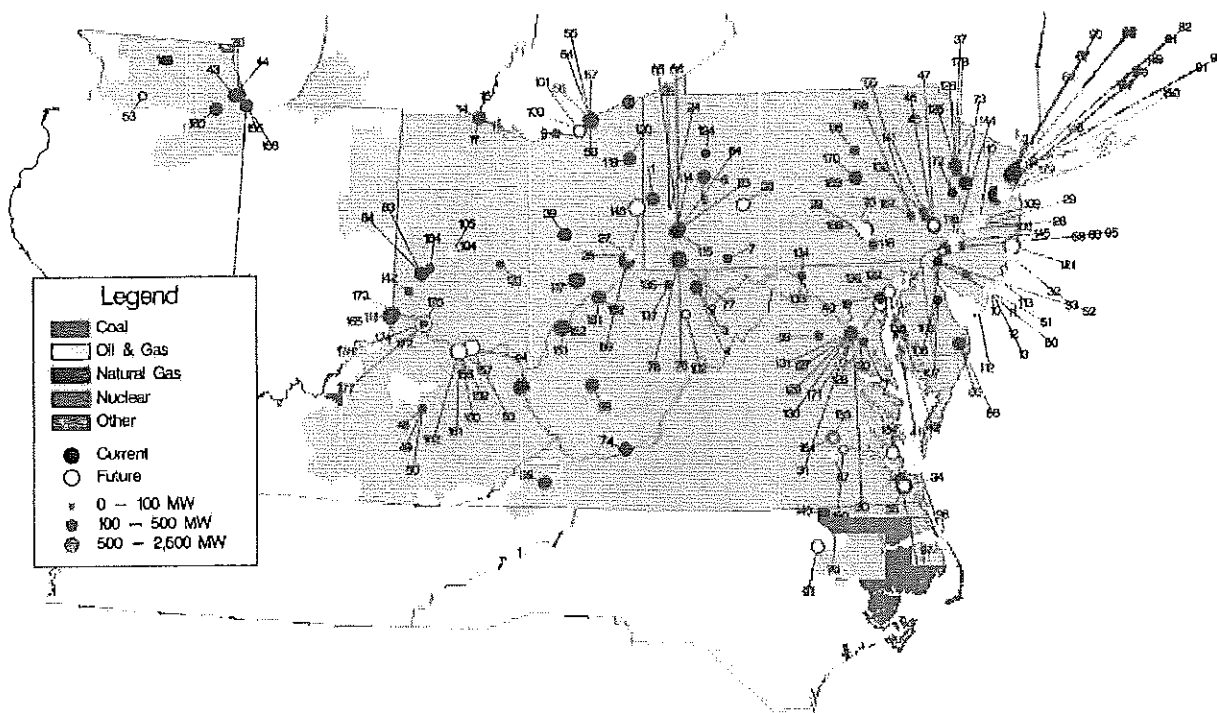
PA

Beaver Valley Power Station

W.H. Sammis Plant

OH

ATTACHMENT E
ACTUAL AND PLANNED GENERATION RETIREMENTS IN PJM, 2011-2020



Key on following page.

Source: Monitoring Analytics LLC, STATE OF THE MARKET REPORT FOR PJM, 2017,
http://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2017.shtml,
Figure 12-1.

Unit identification for map of PJM unit retirements, 2011 through 2020

ID	Unit	ID	Unit	ID	Unit	ID	Unit	ID	Unit	ID	Unit
1	AES Beaver Valley	36	Clinch River 3	71	GUDE Landfill	106	McKee 1	141	Rolling Hills Landfill Generator	176	Walter C Beckjord 5-8
2	Albright 1	37	Columbia Dam Hydro	72	Gilbert 1-4	107	McKee 2	142	SMART Paper	177	Walter C Beckjord GT 1-4
3	Albright 2	38	Colver Power Project	73	Glen Gardner 1-8	108	Mercer 1	143	Sammis 1-4	178	Warren County Landfill
4	Albright 3	39	Conesville 3	74	Glen Lyn 6-8	109	Mercer 2	144	Schuykill 1	178	Weiner 1-4
5	Armstrong 1	40	Crane 1	75	Harrisburg 4 CT	110	Mercer 3	145	Schuykill Diesel	180	Will County 3
6	Armstrong 2	41	Crane 2	76	Halffield's Ferry 1	111	Miami Fort 6	146	Sewaren 1	181	Willow Island 1
7	Arnold (Green Mtn. Wind Farm)	42	Crane GT1	77	Halffield's Ferry 2	112	Middle 1-3	147	Sewaren 2	182	Willow Island 2
8	Ashtabula 5	43	Crawford 7	78	Halffield's Ferry 3	113	Missouri Ave B,CD	148	Sewaren 3	183	Winnebago Landfill
9	Avon Lake 7	44	Crawford 8	79	Hopewell James River Cogeneration	114	Mitchell 2	149	Sewaren 4	184	Yorktown 1-2
10	BL England 1	45	Cromby 1	80	Howard Down 10	115	Mitchell 3	150	Sewaren 6		
11	BL England 2	46	Cromby 2	81	Hudson 1	116	Modern Power Landfill NUO	151	Spartan 1-4		
12	BL England 3	47	Cromby D	82	Hudson 2	117	Mustangum River 1-5	152	Spartan 5		
13	BL England Diesel Units 1-4	48	Dale 1-2	83	Hutchings 1-3, 5-8	118	National Park 1	153	Spruance NUO1 (Rich 1-2)		
14	Bay Shore 1	49	Dale 3	84	Hutchings 4	119	Niles 1	154	Spruance NUO2 (Rich 3-4)		
15	Bay Shore 2	50	Dale 4	85	Indian River 1	120	Niles 2	155	State Line 3		
16	Bay Shore 3	51	Deepwater 1	86	Indian River 3	121	Oyster Creek	156	State Line 4		
17	Bay Shore 4	52	Deepwater 6	87	Ingenco Petersburg	122	Perryman 2	157	Stuart 1		
18	Bayonne Cogeneration Plant (CC)	53	Dixon Lee Landfill Generator	88	Kanawha River 1-2	123	Picway 5	158	Stuart 2		
19	Benning 15	54	Eastlake 1	89	Kanmer 1-3	124	Piney Creek NUO	159	Stuart 3		
20	Benning 10	55	Eastlake 2	90	Kearny 10	125	Portland 1	160	Stuart 4		
21	Beogen 3	56	Eastlake 3	91	Kearny 11	126	Portland 2	161	Stuart Diesels 1-4		
22	Big Sandy 2	57	Eastlake 4	92	Kearny 8	127	Potomac River 1	162	Stuart Diesels 1-4		
23	Bruner Island Diesels	58	Eastlake 5	93	Killen 2	128	Potomac River 2	163	Sunbury 1-4		
24	Brunel Island 1B	59	Eddystone 1	94	Kilpen CT	129	Potomac River 3	164	Taft Battery		
25	Brunel Island 1C	60	Eddystone 2	95	Kinsley Landfill	130	Potomac River 4	165	Tamers Creek 1-4		
26	Burger 3	61	Edgcomb NUO (Rocky 1-2)	96	Kitty Hawk GT 1	131	Potomac River 5	166	Three Mile Island Unit 1		
27	Burger EMD	62	Edison 1-3	97	Kitty Hawk GT 2	132	Pottstown LF (Mosier)	167	Titus 1		
28	Burlington B,II	63	Elrama 1	98	Koppers Co. IPP	133	R Paul Smith 1	168	Titus 2		
29	Burlington B	64	Elrama 2	99	Lake Kingston	134	R Paul Smith 4	169	Titus 3		
30	Buzzard Point East Banks 1,2,4-8	65	Elrama 3	100	Lake Shore 10	135	Riverside 4	170	Viking Energy NUO		
31	Buzzard Point West Banks 1-9	66	Elrama 4	101	Lake Shore EMD	136	Riverside 6	171	Wagner 2		
32	Cedar 1	67	Essex 10-11	102	Laurel Mountain Battery	137	Riversville 5	172	Walter C Beckjord 1		
33	Cedar 2	68	Essex 12	103	MHGO Markus Hook Co-gen	138	Riversville 6	173	Walter C Beckjord 2		
34	Chesapeake 1-4	69	Fauquier County Landfill	104	Mad River CT9 A	139	Roanoke Valley 1	174	Walter C Beckjord 3		
35	Chesapeake 7-10	70	Fisk Street 19	105	Mad River CT9 B	140	Roanoke Valley 2	175	Walter C Beckjord 4		

Source: Monitoring Analytics LLC, STATE OF THE MARKET REPORT FOR PJM, 2017,
http://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2017.shtml, Table 12-6.

Rodriguez, Susan (CONTR)

From: Smith, Christopher <CSmith@gibsondunn.com>
Sent: Thursday, March 29, 2018 12:56 PM
To: Walker, Bruce; Hoffman, Patricia
Cc: Scherman, William S.; Jakubiak, Jeffrey M.
Subject: FirstEnergy Solutions - Copy of 202(c) Application
Attachments: 2018.03.29 - FES 202(c) Application.pdf

Good afternoon,

Please find attached an electronic copy of the application for an emergency order pursuant to Federal Power Act Section 202(c) that FirstEnergy Solutions filed this morning with the Department of Energy.

Sincerely,

Christopher Smith

Christopher Smith

GIBSON DUNN

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Rodriguez, Susan (CONTR)

From: Mersol-Barg, Amy E. <AMersolBarg@gibsondunn.com>
Sent: Friday, May 04, 2018 12:27 PM
To: AskOE
Cc: Walker, Bruce; Hoffman, Patricia; Scherman, William S.; Jakubiak, Jeffrey M.; Smith, Christopher
Subject: FirstEnergy Solutions Letter re 202(c) Application
Attachments: 2018.05.04 FES Response to PJM Letter.pdf

Secretary Perry:

Please find attached a letter from FirstEnergy Solutions Corp. ("FES") responding to a letter that PJM filed on April 30, 2018 concerning FES' Section 202(c) application.

Sincerely,
Amy Mersol-Barg

Amy E. Mersol-Barg

GIBSON DUNN

Gibson, Dunn & Crutcher LLP
1050 Connecticut Avenue, N.W., Washington, DC 20036-5306
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May 4, 2018

VIA EMAIL

The Honorable James Richard Perry
Secretary of Energy
United States Department of Energy
1000 Independence Avenue, S.W.
Washington, DC 20585

Re: Request for Emergency Order Pursuant to Federal Power Act Section 202(c)

Dear Secretary Perry:

FirstEnergy Solutions Corp. ("FES"), on behalf of its affiliates named in its March 29, 2018 Section 202(c) application (the "Application"), respectfully responds herein to the April 30, 2018 letter to you from PJM Interconnection, L.L.C. ("PJM") regarding PJM's Fuel Security Initiative.

PJM's views on resilience are best summed up by the classic image of Lucy holding a football for Charlie Brown to kick, only to pull it away at the last moment, resulting in Charlie Brown once again flying through the air and landing flat on his back. Indeed, PJM's latest procedural gambit confirms what FES has been warning DOE (and FERC) about all along: at a time when resilient generation is closing permanently, PJM continues to refuse to act, like Lucy continuing to pull away the football. PJM now suggests that it will take action sometime next year "*if*" PJM thinks it is necessary. Once again, PJM is asking DOE (and the Nation) to "rely on a narrow process run by an entity that has admitted that it does not have a clear view of what resilience is, how to measure it, or how to ensure it."¹ PJM's latest letter demonstrates that what was true then remains true now: PJM is either unwilling or unable to address effectively the emergency facing the Nation's electric grid. But unlike Charlie Brown, DOE does not need to keep blindly "trusting" Lucy since it *can kick the ball now* and address the resilience crisis by granting FES' Application.

Faced with a growing consensus that something must be done now to address the resilience crisis, and unlike its prior statements to FERC and others eschewing that any real problem exists, PJM now pivots and *belatedly* "recognizes that fuel security raises questions about electric system resilience which go beyond reliability" and that it must "[i]dentify system vulnerabilities and determine attributes . . . that ensure that peak demands can be met during extreme scenarios."² This sudden revelation rings hollow as it stands in stark contrast to PJM's

¹ Letter from FirstEnergy Solutions to Rick Perry, U.S. Sec'y of Energy at 1 (Mar. 30, 2018).

² Letter from Steven R. Pincus, Assoc. Gen. Counsel, PJM Interconnection, L.L.C., and Craig Glazer, Vice President, Fed. Gov't Policy, PJM Interconnection, L.L.C., to Rick Perry, U.S. Sec'y of Energy at 1-2 (Apr. 30, 2018) ("April 30 Letter").

recent and consistent refusal to acknowledge the problem let alone to act to address resilience issues.³

For example, just two months ago PJM told FERC that: 1) it needed authority to plan for resilience;⁴ 2) it lacked formal resilience criteria;⁵ 3) its existing markets were not designed with resilience in mind;⁶ 4) it required FERC to verify that it correctly identified system threats;⁷ and 5) it lacked requisite information, including real-time conditions on pipelines that support natural-gas fired power plants.⁸ But now PJM asserts all of a sudden that sometime next year it may be capable of identifying resilience attributes and designing a market mechanism to compensate generators for the resiliency benefits they provide “if” action is warranted.

PJM has made a similar about-face with respect to the need for nuclear and coal-fired generation in the electric grid. Following the cold weather in the Eastern United States last winter, Andy Ott, President and CEO of PJM, conceded that “[PJM] couldn’t survive without gas; [PJM] couldn’t survive without coal; [PJM] couldn’t survive without nuclear. [PJM] need[s] them all in the moment.”⁹ Since then, PJM has concluded that its grid “will remain reliable” despite the retirement of three FirstEnergy nuclear plants,¹⁰ representing a combined capacity of approximately 4,000 MW,¹¹ again ignoring concerns related to *resilience*. Further, Mr. Ott recently claimed that “[w]e do not feel we have a vulnerability today, *but will take a look at the system to see if we could have fuel security issues in the future.*”¹²

³ See, e.g., PJM INTERCONNECTION, PJM’S EVOLVING RESOURCE MIX AND SYSTEM RELIABILITY 5-6 (Mar. 30, 2017) (“‘Heavy’ reliance on one resource type, such as a resource portfolio composed of 86 percent natural gas-fired resources, however, raises questions about electric system resilience, which are beyond the reliability questions this paper sought to address.”), <http://www.pjm.com/~media/library/reports-notices/special-reports/20170330-pjms-evolving-resource-mix-and-system-reliability.ashx>; *Ott Addresses Resilience Importance at Grid 20/20*, PJM INSIDE LINES (Sept. 19, 2017) (quoting Andrew Ott, President and CEO, PJM Interconnection, L.L.C.) (“[Resilience] activities will happen as a part of the discussion. If we don’t do something, it will be done for us.”), <http://insidelines.pjm.com/ott-addresses-resilience-importance-at-grid-2020/>.

⁴ Comments and Responses of PJM Interconnection, L.L.C. at 5-6, *Grid Resilience in Regional Transmission Organizations and Independent System Operators*, FERC Docket No. AD18-7-000 (Mar. 9, 2018).

⁵ *Id.* at 37.

⁶ *Id.* at 66.

⁷ *Id.* at 5.

⁸ *Id.* at 6-8.

⁹ Press Release, Sen. Lisa Murkowski, Hearing Spotlights Importance of Energy Infrastructure, Diverse Fuel Mix (Jan. 23, 2018) (quoting Andrew Ott), <https://www.murkowski.senate.gov/press/release/hearing-spotlights-importance-of-energy-infrastructure-diverse-fuel-mix>.

¹⁰ April 30 Letter at 3-4.

¹¹ *Generation Deactivations*, PJM, <http://www.pjm.com/planning/services-requests/gen-deactivations.aspx> (last visited May 4, 2018).

¹² *PJM Will Test U.S. Mid Atlantic/Midwest Power Grid for Resiliency*, REUTERS (Apr. 30, 2018) (emphasis added), <https://www.reuters.com/article/pjm-power-resiliency/pjm-will-test-us-mid-atlantic-midwest-power-grid-for-resiliency-idUSL1N1S70XK>.

PJM's ever-shifting and inconsistent statements and positions underscore that action is needed, but PJM will not be the one to take it, at least in any meaningful time frame. PJM's latest announcement is nothing more than a delaying tactic. As PJM knows full well, the design and implementation of a "market-based approach" would take years even under the best circumstances. The grid and the Country do not have years. And as the failure of its capacity performance regime shows, PJM has a dismal track record of adopting effective "market based" approaches to these sorts of issues.

The Nation's wholesale electric markets have failed to recognize and properly value the benefits provided by nuclear and coal-fired generators for years, and, as a result, these generators face the imminent choice of whether to retire. PJM's consistent contradictions demonstrate that it lacks a firm grasp on the resilience problems facing the grid today, let alone how to address them, "if" it ever does.

The Department of Energy recently stated that FERC "has not taken sufficient action" despite "studying the underlying economic and regulatory causes of this problem for years" and so "urge[s] FERC to take *immediate* action to stop the loss of fuel-secure capacity."¹³ But the Department of Energy need not and indeed should not wait on FERC. Rather, urgent action by the Department of Energy is the only way to preserve nuclear and coal-fired generation while a long-term solution is developed by DOE and FERC.

Respectfully submitted,

/s/ Rick C. Giannantonio

William S. Scherman
Jeffrey M. Jakubiak
Jennifer C. Mansh
Gibson, Dunn & Crutcher LLP

Rick C. Giannantonio
General Counsel
FirstEnergy Solutions Corp.

Counsel for Applicants

cc: Bruce J. Walker, Assistant Secretary, DOE OEDER
Patricia A. Hoffman, Principal Deputy Assistant Secretary, OEDER

¹³ Gavin Bade, *PJM Launches Fuel Security Initiative to Counter Gas Reliance*, UTILITY DIVE (May 1, 2018) (quoting Shaylyn Hines, Spokesperson, Dep't of Energy) (emphasis added), <https://www.utilitydive.com/news/pjm-launches-fuel-security-initiative-to-counter-gas-reliance/522531/>.

Rodriguez, Susan (CONTR)

From: Stamas, George P. <GStamas@gibsondunn.com>
Sent: Monday, May 21, 2018 3:28 PM
To: Stamas, George P.
Subject: Gibson Dunn Strengthens Private Equity and M&A Practices With Four Corporate Partners

As I believe you are aware, I am pleased to advise you that I have joined the international law firm of Gibson, Dunn & Crutcher as a senior partner. Gstamas@gibsondunn.com (200 Park Avenue, New York, NY 10166 – 212.351.5300); (1050 Connecticut Avenue, N.W., Washington DC 20036 202.955.8280).

My best,
George

George P. Stamas

GIBSON DUNN

Gibson, Dunn & Crutcher LLP
1050 Connecticut Avenue, N.W., Washington, DC 20036-5306
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GStamas@gibsondunn.com • www.gibsondunn.com

New Partner Announcement
May 2018

Gibson Dunn Strengthens Private Equity and M&A Practices With Four Corporate Partners

Gibson, Dunn & Crutcher LLP is pleased to announce that George Stamas, Mark Director, Andrew Herman, and Alexander Fine have joined the firm as partners. Mr. Stamas will work in the firm's New York and Washington, D.C. offices, while Messrs. Director, Herman and Fine will be based in the Washington, D.C. office and also will work regularly in the New York office. They all join from Kirkland & Ellis, continuing their corporate, mergers and acquisitions and private equity practices.

"We are delighted to add this distinguished team to the firm," said Ken Doran, Chairman and Managing Partner of Gibson Dunn. "George, Mark, Andrew and Alex are talented, highly regarded lawyers and energetic business developers. They have strong contacts in the legal and business communities in D.C., New York and internationally. Their addition will significantly strengthen our M&A, private equity and corporate practices not just on the East Coast but across the firm worldwide."

"Many of us here at Gibson Dunn have worked opposite of this group in a number of transactions, and we have the utmost respect for them," said Stephen Glover, a partner in the Washington, D.C. office and Co-

Chair of the M&A Practice Group. "Our combined practice will create a D.C. corporate powerhouse that will firmly establish our position as a leader in high-end corporate and M&A. In addition, their private equity and public company M&A experience will complement and expand our national and international practice."

"We are excited about the opportunity to join the firm," said Mr. Stamas. "We have long admired Gibson Dunn's culture and collaborative approach to servicing clients. We are committed to joining the team and further developing our practice together. We wish the very best to our former colleagues, who we hold in high regard."

About George Stamas

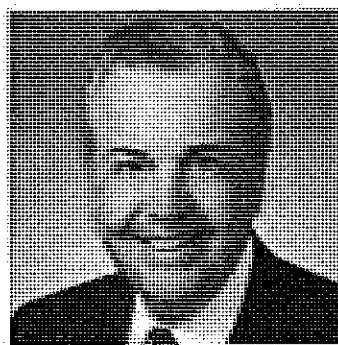
Mr. Stamas served as a senior partner in Kirkland & Ellis' corporate practice group since 2002 and will continue to serve as a senior partner in Gibson Dunn's New York and Washington, D.C. offices. He focuses on public company and private equity M&A and corporate securities transactions. He also counsels C-level executives and board of directors on corporate governance matters.

Mr. Stamas has previously served as Vice Chair of the Board of Deutsche Banc Alex Brown, Inc.; as a founding board member of FTI Consulting (NYSE); as a venture partner of international venture capital firm New Enterprise Associates; and as a member of numerous public and private corporate boards.

He is an executive board member of New York private equity firm MidOcean Partners. He also is a board member of the Shakespeare Theatre Company and on the National Advisory Council of Youth Inc. He is a co-founder of The Hellenic Initiative and a member of The Council on Foreign Relations.

Mr. Stamas is also a partner of Monumental Partners, which controls the Washington Capitals and Washington Wizards, and is a partner of the Baltimore Orioles.

He graduated in 1976 from the University of Maryland Law School, where he was a member of the *International Law Review*, and from 1977 to 1979, he served as special counsel to Stanley Sporkin in the Enforcement Division of the Securities and Exchange Commission.



George P. Stamas

Partner

gstamas@gibsondunn.com

Tel: +1 202.955.8280

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vCard

About Gibson Dunn

Gibson, Dunn & Crutcher LLP is a leading international law firm. Consistently ranking among the world's top law firms in industry surveys and major publications, Gibson Dunn is distinctively positioned in today's global marketplace with more than 1,250 lawyers and 20 offices, including Beijing, Brussels, Century City, Dallas, Denver, Dubai, Frankfurt, Hong Kong, Houston, London, Los Angeles, Munich, New York, Orange County, Palo Alto, Paris, San Francisco, São Paulo, Singapore, and Washington, D.C. For more information on Gibson Dunn, please visit our website.

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Rodriguez, Susan (CONTR)

From: Scott.Mason@hklaw.com
Sent: Wednesday, June 13, 2018 3:13 PM
To: McCormack, Brian
Subject: hey

B - (b) (6) Congrats and keep up all the great work at DoE. Please keep in touch as you guys further investigate/develop the list of coal/nuclear plants that should be kept alive for security purposes. We'd love to see Navajo Generating Station in AZ added to that list, keeping with the POTUS commitment to coal jobs in the U.S., especially since Zinke/Dol own 24% of it. Thanks for considering, happy to come discuss.

Let's visit soon regardless, grab lunch etc. Have another issue to discuss that is going to require significant U.S. energy infrastructure – or we'll lose an emerging technology to the Chinese and Russians. Not good.

Thanks,
Scott

Scott Mason | Holland & Knight
Sr Policy Advisor
Holland & Knight LLP
800 17th Street N.W., Suite 1100 | Washington, DC 20006
Phone 202.469.5330 | Fax 202.955.5564
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scott.mason@hklaw.com | www.hklaw.com

NOTE: This e-mail is from a law firm, Holland & Knight LLP ("H&K"), and is intended solely for the use of the individual(s) to whom it is addressed. If you believe you received this e-mail in error, please notify the sender immediately, delete the e-mail from your computer and do not copy or disclose it to anyone else. If you are not an existing client of H&K, do not construe anything in this e-mail to make you a client unless it contains a specific statement to that effect and do not disclose anything to H&K in reply that you expect it to hold in confidence. If you properly received this e-mail as a client, co-counsel or retained expert of H&K, you should maintain its contents in confidence in order to preserve the attorney-client or work product privilege that may be available to protect confidentiality.

Rodriguez, Susan (CONTR)

From: Eames, Frederick R. <feames@hunton.com>
Sent: Tuesday, June 26, 2018 4:50 PM
To: Winberg, Steven
Subject: RE: Meeting Request

Thanks Steve. Appreciate it.

From: Winberg, Steven [mailto:Steven.Winberg@hq.doe.gov]
Sent: Tuesday, June 26, 2018 7:49 PM
To: Eames, Frederick R.
Subject: RE: Meeting Request

Fred
Someone at FE will reach out tomorrow to schedule. If you do not hear from anyone, ping me.

From: Eames, Frederick R. <feames@hunton.com>
Date: Tuesday, Jun 26, 2018, 7:04 PM
To: Winberg, Steven <Steven.Winberg@hq.doe.gov>
Subject: Meeting Request

Steve – I hope you are doing well.

I am writing to request a meeting with you on behalf of the Energy Advance Center, a coalition we formed a few months ago to promote CCUS. Our members include several oil companies, a major utility, and manufacturers/vendors in the CCUS arena. We will have folks in town on July 12 for meetings to promote sound implementation of the Section 45Q tax credit. DOE has a role in that credit, along with EPA and DOI, in consulting with Treasury on the definition of “secure geological storage.” There is an unnecessary lack of clarity currently regarding that definition, particularly as it applies to storage in an EOR context. That needs to be straightened out for the credit to be effective.

Would you and/or your team be able to meet with us on the 12th, preferably around 9 or 9:30 that day? I understand from your team that time may be difficult, so either afternoon of the 12th or late afternoon of the 11th as an alternative?

Thanks very much.

**HUNTON
ANDREWS KURTH**

Frederick Eames
Partner
feames@HuntonAK.com
p 202.778.2245
bio | vCard

Hunton Andrews Kurth LLP
2200 Pennsylvania Avenue, NW
Washington, DC 20037

HuntonAK.com

Rodriguez, Susan (CONTR)

From: Eames, Frederick R. <feames@hunton.com>
Sent: Thursday, July 12, 2018 4:54 PM
To: Winberg, Steven
Subject: RE: Meeting Request

Steve – Thanks very much for meeting with us yesterday, and for your support on this issue. We very much appreciate the department's consideration. If there is any additional information you need, please let me know. Thanks again.

From: Winberg, Steven [mailto:Steven.Winberg@hq.doe.gov]
Sent: Tuesday, June 26, 2018 7:49 PM
To: Eames, Frederick R.
Subject: RE: Meeting Request

Fred
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Thanks very much.

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ANDREWS KURTH

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Partner
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p 202.778.2245
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Hunton Andrews Kurth LLP
2200 Pennsylvania Avenue, NW
Washington, DC 20037

HuntonAK.com

Rodriguez, Susan (CONTR)

From: Stamas, George P. <GStamas@gibsondunn.com>
Sent: Monday, July 30, 2018 5:31 AM
To: Dabbar, Paul
Subject: Re: Ubik 360

Paul, by the way, certain large power plant owners who spend incredible sums on poorly constructed security systems are showing real interest in Ubik360.

George P. Stamas

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200 Park Avenue, New York, NY 10166-0193
Tel +1 212.351.5300 • Cell (b) (6)
GStamas@gibsondunn.com • www.gibsondunn.com

On Jul 26, 2018, at 4:15 PM, Dabbar, Paul <Paul.Dabbar@hq.doe.gov> wrote:

That sounds great

Paul

Paul M. Dabbar | Under Secretary for Science | U.S. Department of Energy |
James V. Forrestal Building | Department of Energy Headquarters |
1000 Independence Ave, S.W., Washington D.C. 20585 USA |

Scheduler contact: Sabrina Smith | T: +1 202 586 5784 | Sabrina.Smith@em.doe.gov

From: Alexander, Talia [<mailto:TAlexander2@gibsondunn.com>]
Sent: Thursday, July 26, 2018 3:24 PM
To: Dabbar, Paul <Paul.Dabbar@hq.doe.gov>
Cc: Stamas, George P. <GStamas@gibsondunn.com>; Lee, Anna <ALee2@gibsondunn.com>
Subject: RE: Ubik 360

Good Afternoon Mr. Dabbar,

Thank you for providing your availability. George is available for dinner on Wednesday, August 15th in DC. Would you like to meet him at The Metropolitan Club at 6:30 PM? If you prefer another location please let me know and I will be happy to schedule it.

Warm regards,
Talia

From: "Dabbar, Paul" <Paul.Dabbar@hq.doe.gov>
Date: July 26, 2018 at 12:39:01 PM EDT
To: "Stamas, George P." <GStamas@gibsondunn.com>
Subject: RE: Ubik 360

Im am pretty open for dinner a few weeks. This fall Im am on the road much of the time

Here are some open dates:

(b) (6)

Paul M. Dabbar | Under Secretary for Science | U.S. Department of Energy |
James V. Forrestal Building | Department of Energy Headquarters |
1000 Independence Ave, S.W., Washington D.C. 20585 USA |

Scheduler contact: Sabrina Smith | T: +1 202 586 5784 | Sabrina.Smith@em.doe.gov

From: Stamas, George P. [<mailto:GStamas@gibsondunn.com>]
Sent: Thursday, July 26, 2018 12:21 PM
To: Dabbar, Paul <Paul.Dabbar@hq.doe.gov>
Subject: Re: Ubik 360

Love to dinner! Can your office suggest datez that work for you?

On Jul 26, 2018, at 11:40 AM, Dabbar, Paul <Paul.Dabbar@hq.doe.gov> wrote:

George:

Great to hear from you. Hope the transition is going well

I had checked in with some of my lab team on it, and no specific application for it was seen by them. But thank you for bringing it to my attention

Lets plan to have dinner in the early fall sometime?

Paul

Paul M. Dabbar | Under Secretary for Science | U.S. Department of Energy |
James V. Forrestal Building | Department of Energy Headquarters |

1000 Independence Ave, S.W., Washington D.C. 20585 USA |

Scheduler contact: Sabrina Smith | T: +1 202 586 5784 | Sabrina.Smith@em.doe.gov

From: Stamas, George P. [<mailto:GStamas@gibsondunn.com>]

Sent: Wednesday, July 25, 2018 3:12 PM

To: Dabbar, Paul <Paul.Dabbar@hq.doe.gov>

Subject: Ubik 360

Paul, trust summer well. Ubik getting some traction. If you want to see any follow up from your end of course let me know. Hope to see you soon. Best George

George P. Stamas

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Rodriguez, Susan (CONTR)

From: Dabbar, Paul
Sent: Friday, August 03, 2018 10:19 AM
To: Alexander, Talia
Subject: RE: Ubik 360

Great

Paul M. Dabbar | Under Secretary for Science | U.S. Department of Energy |
James V. Forrestal Building | Department of Energy Headquarters |
1000 Independence Ave, S.W., Washington D.C. 20585 USA |

Executive Assistant: Sabrina Smith | T: +1 202 586 5784 | Sabrina.Smith@em.doe.gov

From: Alexander, Talia <TAlexander2@gibsondunn.com>
Date: Friday, Aug 03, 2018, 12:52 PM
To: Dabbar, Paul <Paul.Dabbar@hq.doe.gov>
Subject: RE: Ubik 360

Hi Paul, let's go with the 27th. I'll send an invite.

Talia Alexander
Legal Secretary

GIBSON DUNN

Gibson, Dunn & Crutcher LLP
1050 Connecticut Avenue, N.W., Washington, DC 20036-5306
Tel +1 202.887.3799 • Fax +1 202.467.0539
TAlexander2@gibsondunn.com • www.gibsondunn.com

From: Dabbar, Paul <Paul.Dabbar@hq.doe.gov>
Sent: Friday, August 3, 2018 12:29 PM
To: Alexander, Talia <TAlexander2@gibsondunn.com>
Subject: RE: Ubik 360

(b) (6)

Paul M. Dabbar | Under Secretary for Science | U.S. Department of Energy |
James V. Forrestal Building | Department of Energy Headquarters |
1000 Independence Ave, S.W., Washington D.C. 20585 USA |

Executive Assistant: Sabrina Smith | T: +1 202 586 5784 | Sabrina.Smith@em.doe.gov

From: Alexander, Talia <TAlexander2@gibsondunn.com>
Date: Friday, Aug 03, 2018, 12:05 PM
To: Dabbar, Paul <Paul.Dabbar@hq.doe.gov>
Subject: RE: Ubik 360

Hi Paul,

Thank you for letting me know. Please send me your dates for September and we can go from there.

Kind regards,
Talía

Talia Alexander
Legal Secretary

GIBSON DUNN

Gibson, Dunn & Crutcher LLP
1050 Connecticut Avenue, N.W., Washington, DC 20036-5306
Tel +1 202.887.3799 • Fax +1 202.467.0539
TAlexander2@gibsondunn.com • www.gibsondunn.com

From: Dabbar, Paul <Paul.Dabbar@hq.doe.gov>
Sent: Friday, August 3, 2018 12:01 PM
To: Alexander, Talia <TAlexander2@gibsondunn.com>
Cc: Stamas, George P. <GStamas@gibsondunn.com>; Lee, Anna <ALee2@gibsondunn.com>
Subject: RE: Ubik 360

Talia

I have to travel now the 15. I'm still free (b) (6) . If not those days, we can look at Sept.

Next weeks dates are now taken up

Pleas let me know.

Paul

Paul M. Dabbar | Under Secretary for Science | U.S. Department of Energy |
James V. Forrestal Building | Department of Energy Headquarters |
1000 Independence Ave, S.W., Washington D.C. 20585 USA |

Executive Assistant: Sabrina Smith | T: +1 202 586 5784 | Sabrina.Smith@em.doe.gov

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Date: Thursday, Jul 26, 2018, 3:24 PM
To: Dabbar, Paul <Paul.Dabbar@hq.doe.gov>
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George P. Stamas

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GStamas@gibsondunn.com • www.gibsondunn.com

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Rodriguez, Susan (CONTR)

Subject: Dinner: Paul Dabbar & George Stamas
Location: The Metropolitan Club | 1700 H St NW, Washington, DC 20006

Start: Thu 9/27/2018 3:30 PM
End: Thu 9/27/2018 5:30 PM
Show Time As: Tentative

Recurrence: (none)

Organizer: Stamas, George P.

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